Field Museum News

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NEW TAXIDERMY METHOD APPLIED TO CASSOWARY PRESERVES LIFE COLORS

By Karl P. Schmidt
Assistant Curator of Reptiles

A new specimen of the large flightless bird called the cassowary was recently placed on exhibition in the systematic collection of birds in Hall 21. It is of especial interest because of the use of the so-called "celluloid" method in its preparation which renders its highly colored naked parts in verisimilitude to life.

Cassowaries differ conspicuously from the other large flightless birds by the development of a horny casque on the head, and by the presence of brightly colored wattles and extensive areas of brilliantly colored bare skin on the neck, as well as in various other anatomical characters. Their nearest relatives are the emus of the Australian plains; and they are more distantly related to the African ostriches and South American rheas. The cassowaries are forest inhabitants, and share with other forest birds the tendency (especially exemplified by the birds of the New Guinean region) to brilliant coloration. The specimen now placed on exhibition belongs to a species confined to the island of Jobi, off the coast of northwestern New Guinea.

Other specimens of cassowaries in Field Museum were collected by the Cornelius Crane Pacific Expedition in 1929, and some are preserved in the reference collection. One of these was a half-grown bird, obtained at Madang, New Guinea. Its flesh was eaten by the party and crew on Mr. Crane's yacht, *Illyria*, and it proved to be of extremely good flavor, somewhat intermediate in character between fowl and beef.

These birds are much hunted by the native Papuans for food, and there is even a word for cassowary, "mooruk," in their "pidgin English," all other birds being known simply as "pigeons." A full-grown specimen obtained from native hunters by the Museum party at Marienberg, on the Sepik River, was skinned and preserved. The brightly colored fleshy wattles on the neck, and the horny casque filled with spongy bony tissue, were especially difficult to preserve in the humid tropical climate. In the dried skin now in the collection, these structures have lost every vestige of their brilliant coloration and the horny layers of the casque have split so as to lose their natural translucence.

It was such difficulties that made the acquisition of a fresh full-grown specimen in the flesh by the Museum an especially notable event in bird taxidermy, since such a specimen could be converted by the application of the unique celluloid process invented by Leon L. Walters of Field Museum's taxidermy staff, into an exhibit which really presents the natural appearance of one of these extraordinary birds. The Walters process consists in an exact reproduction in cellulose-acetate of the outer layers of skin or horn in question, and this is made in a mold from the original animal. By the admixture of the proper pigments in the dissolved cellulose-acetate, the coloration is exactly reproduced, and as the pigment is distributed in a translucent medium, the degree of translucence can be controlled to represent exactly the condition of the living original. Since, furthermore, the colored cellulose-acetate cast is finished when it is taken from the mold, and requires no additional painting, the surface detail of the original is retained without loss.

In the case of the cassowary in question, molds were made of the head and neck and of the legs and feet, and the cellulose-acetate replicas of these parts were assembled with the original skin of the body. The feathers on parts of the head and neck were transferred to the new cellulose-acetate "skin" by the simple but extremely ingenious process of embedding them in the wax mold until their bases were held in the newly applied cellulose-acetate layer which constitutes the cast. Subsequently the wax was removed. This transfers each feather to the new material in exactly its original position.

The application of celluloid-like materials in museum preparation was developed by Mr. Walters to meet the problem of making life-like models of reptiles and amphibians. It has proved equally satisfactory in the production of exhibition specimens of hairless and thin-haired mammals, and is now applied for the first time to a large bird.

Field Museum is indebted to Floyd S. Young, Superintendent of the Lincoln Park Zoological Gardens, for the gift of the cassowary, which had been in captivity in the park for several years.

The Cassowary

Strange flightless bird of the New Guinean region, exhibited in Hall 21. The head and the legs are reproduced in cellulose-acetate, representing the first use on a bird of this new taxidermy method developed in recent years for work on reptiles and hairless mammals. Staff Taxidermist Leon L. Walters, originator of the process, and Edgar G. Layhourne, prepared the specimen.

CHINESE DINNER SERVICE

A recent addition to the Chinese ethnological exhibits in Hall 32 consists of a complete dinner set for eight persons, which includes one hundred and fifty pieces. The exhibit shows all the utensils used by the Chinese in taking their meals at home or giving a formal dinner party. Each person is provided with a teacup, a rice bowl, a soup bowl, and a small dish of condiments. The heavy courses are served in various large bowls, four or five of which are placed on the table at a time, and from which each guest helps himself by dipping from them with his chopsticks.

It is a noteworthy fact that most nations of Asia still eat with their fingers, and the Chinese were the first who introduced good table manners by the invention and use of chopsticks.

A wide variety of chopsticks is displayed, made of various materials such as ivory, bone, bamboo, wood plain or lacquered, horn, and silver. Scabbards to hold these, and knives, used by travelers, are also exhibited. A special silver pair of chopsticks, connected by a chain, are symbolical, being used by a bride and groom on their wedding day.

Albino birds and mammals of many species constitute a special exhibit in the Department of Zoology.

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

FIELD MUSEUM NEWS

STEPHEN C. SIMMS, *Director of the Museum*.....*Editor*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Acting Curator of Anthropology*
B. E. DAHLGREN.....*Curator of Botany*
HENRY W. NICHOLS.....*Curator of Geology*
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Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in FIELD MUSEUM NEWS.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to FIELD MUSEUM NEWS is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

NORTH AMERICAN BIRD SERIES IN HALL 21 COMPLETED

With the installation recently of a new exhibit of cuckoos, parrots, whip-poor-wills, hummingbirds, swifts, kingfishers, and their relatives, the systematic collection of North American birds in Hall 21 has been completed. The hall now has on display every important species of bird found in North America north of the Rio Grande River—an aggregate of more than 700 species, according to Rudyerd Boulton, Assistant Curator of Birds. Preparation of the series has been under way steadily for the past nine years. Mounting of the birds has practically all been the work of one man, Staff Taxidermist Ashley Hine, and it is the only comprehensive collection of its kind in the country which can thus be designated as a "one-man show."

The last addition contains forty-four specimens, including a number of rare and unusual birds. Among them is the extinct Carolina paroquet which formerly was found at times in Illinois; the ruby-throated hummingbird which is still seen in Chicago, and ten of its relatives of the far southwest; and the night hawk (which is not really a hawk, but a whip-poor-will) that frequently hovers over buildings in Chicago in summer. Of interest is the road-runner, a pheasant-like bird of the cuckoo family which is famed in the southwest where, it is said, it can outdistance a horse as a runner.

EXTENSIVE DATA ON RACES COLLECTED BY EXPEDITION

The Field Museum Anthropological Expedition to the Near East, sponsored by Marshall Field, last month concluded its work for 1934 consisting of an anthropometric survey of the native population of Iraq, and similar studies in Persia and the Caucasus region of the U. S. S. R.

The leader of the expedition, Henry Field, Assistant Curator of Physical Anthropology, has returned to his post in the Museum, ready to begin the task of assembling and studying the data collected, which has for its purpose an attempt to solve certain racial problems. One of the objectives is to determine the relationship of the peoples of the Near East, both those of today and their ancient ancestors, to the modern and ancient peoples of Africa, Europe and Asia. This is a question of great scientific importance into which no satisfactory research has previously been made.

The work of the expedition covered a period of ten months, during which 17,000 miles were traveled, and 3,000 persons were submitted to studies, consisting of anthropometric measurements and observations, the taking of front and profile photographs, hair samples, blood samples, and other data pertinent to tracing their racial origins. In addition to its anthropological work, the expedition collected 3,000 animals, 1,000 insects, 2,600 plants, and a quantity of geological material, for the Museum's departments of zoology, botany and geology.

Mr. Field was accompanied by Richard A. Martin of Chicago, who as photographer made 7,000 negatives, and in addition collected the zoological material, as well as assisting the leader in the anthropological work. The anthropological work was a continuation of the survey begun by Mr. Field in 1925. As many as twelve assistants were attached to the expedition at various points for local work.

The anthropological studies were made upon selected subjects from each of the important racial groups. Of special interest in Iraq were the Kurds, fierce-looking mountain tribesmen, of whom 750 submitted to the anthropologists' calipers and cameras, and the Yezidis, fanatical devil worshipers, 300 of whom cooperated by acting as scientific specimens. Forty separate measurements and observations were made on each individual. Living in tents as guests of Sheikh Agil, great desert chieftain of the Shammar Beduins, the members of the expedition were enabled to measure 450 members of his tribe.

The expedition made an archaeological survey of the North Arabian Desert, crossing from Bagdad to Trans-Jordan Palestine and Syria, and thence returning to Iraq. During this trip a large number of prehistoric flint implements testifying to the existence of early man in this area were collected.

After five months in these areas, the expedition proceeded to Persia, where anthropological studies were made of some 250 individuals. After completing its work in that country, the expedition entered the U. S. S. R. at Baku, and traveled through the Caucasus to Kiev, Moscow and Leningrad. In the mountains of the Caucasus some 200 men and women were studied.

The expedition, Mr. Field reports, was greatly assisted by the full cooperation and courtesy extended by the governments of Iraq, Persia and the U. S. S. R., and by scientists and scientific institutions in those countries and elsewhere.

Stock Show Brings Museum Visitors

As a result of the thousands of visitors attracted to Chicago last month by the International Live Stock Exposition, held December 1 to 8, a large additional attendance was received at the Museum. Besides the many persons from out-of town who visited the Museum independently, two large groups of children were brought to the Museum under the auspices of the Four-H Clubs, an organization promoting the interests of young people on farms. Five hundred and forty girls came to the Museum in one group, and 646 boys in another. Of special interest to these visitors were the sculptures by Herbert Haseltine of British champion domestic animals, presented to the Museum by Marshall Field, and recently placed on exhibition in Hall 12. These afforded a basis for comparison of the prize American animals at the Live Stock Exposition with the types of horses, beef and dairy animals, sheep, and pigs produced by breeders overseas.

Gifts to Library

The Museum Library has been favored by the gift of volume 3 of *Les Peintures Rupestres Schématiques de la Péninsule Ibérique* by M. l'Abbé Henri Breuil. This work, presented by the author, is of great assistance to members of the staff.

Mrs. Mae Ellena Bachler presented *Encyclopedic Outline of the Masonic, Hermetic, Qabbalistic and Rosicrucian Symbolic Philosophy* by Manly P. Hall. This was published in a limited edition and the Library is fortunate to receive a copy.

Karl P. Schmidt, Assistant Curator of Reptiles, presented his attractive and interesting *Homes and Habits of Wild Animals*.

There have been also the following additions: Murdock, *Our Primitive Contemporaries;* Lowie, *An Introduction to Cultural Anthropology;* Lockwood, *Story of the Spanish Missions of the Middle Southwest;* Spencer, *Wanderings in Wild Australia;* Parry, *The Lakhers.*

THE AGE AND SOURCE OF METEORITES

By Sharat K. Roy
Assistant Curator of Geology

Comparative studies of the structure and composition of meteorites with those of terrestrial igneous rocks have led students of meteoritics to believe that meteorites are also of igneous origin. Fires glowing in cosmic furnaces of some sort gave the meteorites the physical and chemical characters which they present to us. Little, however, is known of the point of origin of these wanderers in space. Various hypotheses, naming the sun, the moon, comets, earth's volcanoes, and shattered planetoids, have been put forward as a possible source, but none have withstood critical analysis.

Of late, a new method of approach for a more acceptable explanation of the source of meteorites has been tried and, although found promising, it has, like all pioneer work, many difficulties to overcome. This approach is based on the assumption that if meteorites are disintegrated portions of our solar system, their age cannot be greater than that of the solar system. Starting with this assumption, age values for a number of meteorites have been determined.

The age of meteorites is calculated by the radioactive method—that is, by calculating the helium and radium contents of the meteorites. Both helium and radium are disintegration products of uranium, and the rate of accumulation of both is known. Roughly, it takes about 370 million years for 5 per cent of a quantity of uranium to change into helium and other elements. Obviously, however, the radioactive method of age determination of meteorites is applicable only to those which contain radioactive minerals.

So far the radioactivity and helium content of 23 meteorites have been determined. The age values of these range from less than 100 to 2,900 million years. Noteworthy is the fact that not one of these age values is in excess of what is generally accepted to be the age of the earth. True, no terrestrial mineral has yet been found to be older than 1,800 million years, but it must be taken into consideration that the oldest analyzable mineral still remains to be discovered. Most geologists and investigators in the field of radioactivity believe that when the oldest radioactive mineral is found, the age of the earth will have to be raised to 3,000 million years or more. Granting that to be the case, the solidification date of the meteorites so far studied accords well with the assumption that they may have migrated from our solar system rather than from distant celestial bodies.

Field Museum, which houses the largest representative collection of meteorites in the world, has representatives of 14 of the 23 meteorites whose ages have been determined. They may be seen on the west side of Hall 34. Two tubes of glowing helium, one in a fluorescent tube of uranium glass, and the other in a plain tube, may also be seen in the case of rare gases on the wall of the corridor between Hall 36 and Hall 37.

"Traveler's Tree"

In Madagascar there grows a peculiar plant called the "traveler's tree." It is so named because water with which a thirsty wanderer can revive himself is said to be found in its large sheathing leaf bases. It is the only member of the banana family with a woody trunk. A specimen fruit cluster is displayed in the Hall of Plant Life (Hall 29).

Specimens of American Potash

The important new potash discoveries in Texas and New Mexico are now represented in the Museum by large blocks of the salts mined in Carlsbad, New Mexico, and presented to the Museum by the United States Potash Company. They resemble the potash salts mined in Stassfurt, Germany, which have been for many years the most important source of the world's potash. The American specimens are shown in Frederick J. V. Skiff Hall (Hall 37) in the case with the German specimens.

Damage by Meteorite

In the meteorite collection in Hall 34 there is a portion of the floor of a barn from Kilbourn, Wisconsin, which was broken in 1911 by the impact of a meteorite which had penetrated the roof of the building. A cast of the meteorite which caused the damage is placed in the hole in the floor and a slice of the actual meteorite appears near-by. This is one of the few instances—eight or possibly a few more are recorded—of a meteorite actually damaging a building.

TRIAL BY ORDEAL IN AFRICA

Trial by ordeal, with a cup of poison to determine the guilt or innocence of a person accused of theft, witchcraft, or other crimes, is still prevalent among certain African tribes. In the hall of African ethnology (Hall D) are exhibited examples of the poison cup, and of the poisons, used in such trials by the Ovimbundu people of west Africa.

It is said that the medicine man secretly makes up his own mind in advance as to the guilt or innocence of the accused, and thus controls the result, mixing his concoction of poisonous herbs to produce the effect he desires. If the accused suffers from the poison he is adjudged guilty, and is either allowed to die of the poison itself, or is beaten to death. If he is innocent this fact is established by his stomach's rejection of the poison, which may be brought about by the medicine man according to the mixture he administers. This is but one of a number of similar ordeals used in the dispensing of what the African tribesmen are compelled to accept as justice.

LAMA TEMPLE BELL FROM TIBET IS EXHIBITED IN HALL 32

A large cast iron bell from a Lama temple in Tibet is on exhibition among the Oriental ethnological exhibits in Hall 32. Recently reinstalled, this intricately ornamented bell hangs in a heavy wooden frame. Combined with the frame is a sounding apparatus consisting of a suspended heavy timber resembling a battering ram in design, with which the side of the bell could be struck. The bell, when it was in use, produced a note of pleasing tone and great volume.

This bell was cast in 1762 (the K'ien-lung period) by a Chinese artisan named Li Yen-ch'un. It weighs 196 pounds. For many years it hung in the Lama temple near Taochow, Kansu province. It was obtained for the Museum by the Blackstone Expedition to China and Tibet (1908–10), under the leadership of the late Dr. Berthold Laufer.

The bell is decorated with eight trigrams formerly used for purposes of divination; with chrysanthemum flowers, and with dragons playing with a pearl—symbol of an unattainable ideal. Two dragon heads joined together form the outside of the bearing upon which the bell swings on its axis. On three panels on the surface of the main part of the bell are, in high relief, the three stanzas of a Buddhist poem, in the Tibetan language.

Lama Temple Bell

Cast in 1762, this iron bell hung for many years in a Tibetan temple. It is now exhibited in Hall 32.

LACQUERED VESSELS FROM PERU

By J. Eric Thompson
Assistant Curator of Central and South American Archaeology

Although lac resin, derived from the secretion of an insect, was unknown to the ancient inhabitants of South America, the Peruvians painted wooden vessels in a manner resembling the lacquer work of the Orient. From finds in ancient graves it is known that this technique of wood painting had been mastered in Peru before the arrival of the Spaniards, but the majority of the wooden vessels of this type that have survived were made shortly after the Spanish conquest in the sixteenth century.

A fine collection of twenty examples of this technique was recently placed on exhibition in Stanley Field Hall. The exhibit is dominated by a stool supported by two realistic lacquered jaguars. A few of the designs on the vessels represent scenes from life. One depicts a battle fought in the forest, the trees of which are conventionally represented. The Peruvians can be recognized by their clubs and their costumes, which include typical semi-circular headdresses. The enemy is attacking them with bows and arrows, weapons not used by the ancient Peruvians. It is probable that the scene represents an actual battle, for shortly before the arrival of the Spaniards the army of the Inca made an unsuccessful attempt to subdue the Chiriguanos, a tribe of Indians who inhabited the region east of the Andes, and who used the bow and arrow.

Another scene shows Peruvians armed with axes and slings, but most of the vessels are painted with geometric and floral patterns. The former are certainly of Incan origin, but the latter may possibly owe something to Spanish influences.

Two of the jars are shaped as human heads. It is probable that these, as well as the cylindrical vessels, were used to hold *chicha*, the maize beer of the ancient peoples of the Andes.

LIQUORS MADE BY MANY PEOPLES INCLUDED IN EXHIBIT

By Llewelyn Williams
Assistant Curator of Economic Botany

Stimulating beverages produced by the fermentation of fruit juices, plant sap, or other plant material have been known for ages to mankind in all parts of the world. Palm sap drawn off into a vessel ferments almost immediately and becomes palm wine. Likewise, the juice of the Mexican century plant becomes "pulque." The juices of fruits of all kinds have the same property.

Under ordinary conditions of heat and moisture, certain ferments universally present in fruit juices act to convert solutions of sugars into alcohol. This was undoubtedly discovered very early in the history of man, probably prior to the discovery that stimulating drinks may be made also from all kinds of starchy plant material. In these the starches are first converted into sugars, and subsequently into alcohol. In regions where commercial beverages are unknown, the natives prepare fermented liquors from starchy plant material. The Indians of South America chew up and ferment cassava roots to produce "piwarri," while the inhabitants of the Peruvian Andes ferment plantains and bananas for "chicha." In the South Sea Islands the stems and roots of a pepper plant form the source of a potent beverage, "awa." Grapes were grown for the production of wine in the Near East long before the Christian era. The ancient Teutons used honey as a source of sugar from which to brew their mead. Beer is by no means modern, for the ancient Egyptians thousands of years ago were familiar with its manufacture from barley.

The stimulating or intoxicating properties of all fermented beverages are, of course, due to their alcoholic content. By fermentation alone this cannot be increased beyond a certain point, no matter how high the sugar content, as concentration of alcohol inhibits further conversion of sugar.

When a higher alcoholic content is desired it is obtained by distillation of the fermented beverage. This well-known process consists in vaporizing the liquid by boiling and subsequently reconverting the vapor into liquid by cooling in some form of condenser. The process appears to have been known even to very early experimentalists. The Chinese were familiar with it many hundreds of years before its introduction into Europe; the Arabians discovered a number of essential oils by distilling plants, plant juices, and alcohol from wine.

The plant materials employed for the production of distilled liquors are the same as in the manufacture of fermented beverages. The fermentation, however, is carried to the fullest extent and the product is distilled several times to yield a beverage with a higher alcoholic content.

An exhibit of fermented and distilled beverages from many parts of the world has been installed with vegetable food products in Hall 25, Department of Botany. In addition to the usual beverages, the exhibit includes such fermented liquors as "piwarri" from the Guianas, "chicha" from Peru, "toddy" or palm wine from India, "pulque" from Mexico, "awa" from Polynesia, and "perry" from Europe. Distilled liquors include "sake" and "arrack" from the Far East, and "tequila" from Mexico. With each there is shown some of the plant material from which the beverage is produced.

FOSSIL FISHES

By Elmer S. Riggs
Associate Curator of Paleontology

Fossil fishes of many kinds are exhibited in the Museum collections. They are found quite commonly all over the world. Most of them are found in old sea or lake bottoms, some in old channels of streams. The natural chalk which has formed at the bottom of seas offered favorable conditions for their preservation. Such chalk-beds are found in western Kansas, in England, France, Syria and in other localities widely distributed. The chalk-beds of Kansas are the best known in North America. In them are found skeletons of fishes of many species along with those of swimming and flying reptiles. Some of these fishes, notably the great *Portheus molossus*, reached a length of twelve or fourteen feet. They lived in the old Cretaceous sea which flowed over the region now known as the Great Plains, 90 million years ago.

Another locality famous for beautifully preserved fish skeletons is the Eocene lake bed at Green River, Wyoming. The sediments which accumulated at the bottom of this lake have formed ledges of fine-grained shales. These shales are readily split into thin slabs and reveal the skeletons and body outlines of the fish beautifully preserved. By carefully cutting away the rock from about them, the skeletons of the fish are revealed in structural detail.

A fine series of these Green River fishes is exhibited in Ernest R. Graham Hall (Hall 38). They include fishes closely related to modern perch, herring and gar pike.

JANUARY GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for January:

Week beginning December 31: Monday—Animal Groups; Tuesday—New Year's holiday—*no tour*; Wednesday—Plants and Animals of the Past; Thursday—General Tour; Friday—Asiatic Animal Life.

Week beginning January 7: Monday—Peoples of the South Seas; Tuesday—North American Trees and Wood Products; Wednesday—American Archaeology; Thursday—General Tour; Friday—Birds and Their Skeletons.

Week beginning January 14: Monday—Gems and Precious Stones; Tuesday—Interesting Plants and Their Blossoms; Wednesday—Pueblo Indians; Thursday—General Tour; Friday—Egypt and Its Art.

Week beginning January 21: Monday—Cats and Dogs; Tuesday—Uses of Fibers, Barks and Resins; Wednesday—Pewter and Jade; Thursday—General Tour; Friday—Men of the Stone Age.

Week beginning January 28: Monday—Fish and Reptiles; Tuesday—Story of Coal; Wednesday—Tibetan Exhibits; Thursday—General Tour.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in Field Museum News. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Mrs. M. E. L. Gano—2 strings of Russian glass trade beads, Alaska; from Miss Helen B. Bennett—25 stone artifacts, Arkansas; from Mrs. Frank S. Johnson—a Chinese Mandarin coat; from Allyn D. Warren—a large carved wooden figure of Vishnu ridiog on Garuda, Dutch East Indies; from School of Forestry, Yale University—100 herbarium specimens, Colombia; from Professor Martin Cárdenas—85 herbarium specimens, Bolivia; from George L. Fisher—136 herbarium specimens, Texas; from Messrs. Floyd Markham, J. Mann, A. Lee, and Sharat K. Roy—21 invertebrate fossil specimens, Illinois; from The Alaska Museum—32 mineral and ore specimens, Alaska; from John A. Manley—2 limonite geodes, New Jersey; from C. A. Frazier—a diamond-back rattlesnake, Florida; from F. E. Holley—32 insects, Illinois, Indiana, and Panama; from Donald K. Watson—5 beetles, Texas; from John G. Shedd Aquarium—53 fish specimens; from Leslie Wheeler—a red-tailed hawk, Illinois; from Ben Cascard—9 beetles, California; from H. St. J. Philby—1,043 insects and allies, Arabia; from Chicago Zoological Society—2 bower birds, Illinois; from John F. Jennings—796 negatives of photographs taken on Straus-West African Expedition.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from November 16 to December 15:

Associate Members

Samuel O. Dunn, Harold Engstrom, Mrs. W. R. Hodgkinson, Mrs. Bryan Lathrop, Mrs. Walter A. Strong.

Sustaining Members

William D. Cox

Annual Members

Mrs. Walter Ayer, Mrs. Ronald A. Chinnock, Mrs. George L. Cragg, Mrs. Henry Elfborg, Dwight W. Follett, Mrs. David A. Hyman, Solomon Katz, E. B. Lanman, C. W. Noble, Dr. John R. Pontius, Mrs. R. E. Prussing, Mrs. G. William Reynolds, Charles F. Schramm, Clarence P. Scofield, Miss Dorothy Sears, Albert B. Singer, Mrs. George E. Van Hagen, N. C. Webster, Miss E. Lillian Wiersen.

A relief model of a volcanic island, illustrating the principal features of such islands, is on exhibition in Clarence Buckingham Hall (Hall 35).

The huge skeleton of a right whale, so called because it is the type whalers regard as the kind to pursue, is an interesting feature in Hall 19.

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NORTHERN ISLAND "BIRD CITY" SHOWN IN HABITAT GROUP

By Rudyerd Boulton
Assistant Curator of Birds

On a tiny island in Bering Sea, there exists one of the most populous "bird cities" in the world. Walrus Island, the smallest of the four islands that form the Pribilof group, is this metropolis. The Pribilof Islands lie north of the Aleutians and are about three hundred miles from the nearest land. To this refuge, safe from predatory land animals, about nine million birds annually resort to rear their young.

It is characteristic of most colonial nesting sea-birds to use islands or inaccessible cliffs during the nesting season. Isolation is their only defense from four-footed enemies. St. Paul and St. George islands, about 60 square miles in area, are much larger than Walrus, which is only 40 acres in extent. They support great numbers of Arctic foxes as well as the huge fur-seal herds for which the Pribilofs are especially famous. Walrus Island, being an isolated bare rock, is much more attractive from the birds' point of view.

There has recently been reinstalled in Hall 20 of the Museum a habitat group showing a section of a colony on Walrus Island, in which are seen several species of birds, together with their nests, their eggs, and their young. The addition of new specimens and the complete revision of the exhibit have resulted in decided improvements as compared to the group as it formerly was assembled. Staff Taxidermist Leon L. Pray, assisted by Frank Letl, prepared the group. The background was painted by Staff Artist Charles A. Corwin.

One of the most abundant birds on Walrus Island is Pallas' murre, western representative of the better-known Brunnich's murre of the Labrador coast. Murres are highly gregarious birds, especially during the nesting season. They crowd together in huge companies, yet the rights of individuals are strictly preserved. If an intruder trespasses on the few square feet which each murre family regards as its own home and personal property, a fierce battle invariably results. Biting and buffeting with wings, the combatants roll and tumble, creating disorder and dismay among their neighbors. So intent are they in the conflict that not infrequently they roll off the cliff and, still fighting as they fall, are dashed to death on the rocks beneath their nesting ledges.

Murres build no nest whatever, laying their eggs on the bare rock. Large gulls often steal and eat the murres' eggs when they find them unprotected. The eggs are pear-shaped so that when disturbed they roll in a small circle. This curious adaptation doubtless prevents many eggs from rolling off the cliffs during the frequent battles or because of the somewhat awkward movements of the adults. Although perfectly applicable to these birds, which are members of the auk family, the word "awkward" is not derived from the name of the bird, auk, as is often supposed.

Bird Life of Walrus Island

Habitat group in Hall 20 showing murres and other birds which flock by millions to a refuge in the Bering Sea, where they are isolated from predatory mammals.

Another relative, the California murre, is less common on Walrus Island than Pallas' murre. It is not shown in the group. The two species do not intermingle.

While the murres are the outstanding citizens of the island, there are other less numerous but no less interesting nesting birds. All of the twelve species known to breed there are sea-birds. The area of scanty grass in the center of the island is so occupied with nests of the glaucous gull that no land bird ever has the temerity to intrude. Besides the red-faced cormorant, glaucous-winged gull, Pacific kittiwake, and horned puffin which are shown in the group, the regular breeding birds include the tufted puffin, the crested paroquet, the least auklets, and the red-legged kittiwake. The group is a gift to the Museum from President Stanley Field.

OLDEST PRINTING BLOCKS IN WORLD EXHIBITED

The oldest printing blocks in existence anywhere in the world are on exhibition in a collection of bamboo, root, and wood carvings from China in George T. and Frances Gaylord Smith Hall (Hall 24). The blocks are engraved with floral designs and must have been made before the year A.D. 1108. They were found in the ancient city of Chu-lü in the southern part of the province of Chi-li. This city, excavated by archaeologists in recent years, was submerged by a flood in 1108.

The Chinese are the inventors of block-printing, and, in fact, of all the essentials for printing—paper, writing brush, ink, and ink-pallet or inkstone. They invented and perfected these entirely from their own resources, unaided by any other nation. Paper was invented and manufactured in China as early as A.D. 105. Under the Sung dynasty (A.D. 960–1279), the printing of books from wooden blocks was a flourishing art. The manufacture of paper remained a Chinese monopoly until A.D. 751 when the technique was introduced into Samarkand by Chinese captives of an invading Arab force. This led to the substitution of paper for papyrus throughout the Arab dominions, the importation of paper into Europe, and finally the establishment of the first European paper-mill in Italy.

Paper money was first printed and circulated in China. Wall-paper, much of it made from printing blocks such as are displayed at the museum, is another Chinese invention. The Chinese were the first people to print books, many centuries before Gutenberg, and they were also the first to conceive the idea of the printed daily newspaper. The *Peking Gazette* (*Ching Pao*) began to appear in A.D. 713, and was issued daily until the collapse of the Manchu dynasty in 1911.

New Guidebook Published

The seventeenth edition of the General Guide to the exhibits has just been published by Field Museum Press. It has been thoroughly revised so as to cover all important changes made in the exhibits. Copies are sold at 15 cents each, plus 3 cents for postage if ordered by mail.

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

WITH DUE APPRECIATION TO MUSEUM MEMBERS

Field Museum is especially indebted to its Members for the manner in which they have loyally supported it during the past few years of depression. While for several years there was a rather serious decline in the number of persons on the Museum's membership rolls, this seems to have been almost completely arrested during 1934. Much encouragement is found in the fact that the net loss of Members in 1934 was only 57, as compared to losses of 320 in 1933, 819 in 1932, and 702 in 1931. The total number of members is still well above 4,000.

The indications are that a turning point may at last have been reached—that there is now hope that the number of Members will begin to *increase*. To all those who have retained their memberships during the years of difficulty the deepest appreciation is due, and the hope is expressed that they may continue their association with this institution. To those who for one reason or another felt compelled to cancel their memberships, an invitation is extended to renew their connection with the Museum whenever it may be possible. To any Members having acquaintances who might be interested in becoming Members an urgent appeal is made that they propose the names of such friends to the Museum. The contributions received in the form of membership fees are an important item in the Museum's revenues. A larger membership giving the institution support in this manner is very much needed to aid in solution of the financial problems involved in maintaining the institution's high standards of service in educational work and scientific research.

—Stephen C. Simms, *Director*

SERVICES OF RELIEF WORKERS BENEFIT FIELD MUSEUM

Since the latter part of 1933, museums and other institutions of civic character throughout the country have been cooperating with the various relief agencies of the federal government and the states in providing useful employment for large numbers of the persons being assisted by those agencies.

At the invitation of the Illinois Emergency Relief Commission, Field Museum became one of the institutions participating in the "work relief" plans. As a result, during 1934, and the last month of 1933, approximately 350 unemployed men and women have had temporary employment for periods of various lengths at this institution, and great benefits have been derived in the advancement of the work of almost every Department and Division of the Museum. Besides the workers assigned to the Museum by the Illinois Emergency Relief Commission under its own authority, the Museum has had workers assigned and paid by the Civil Works Service, Civil Works Administration, and Public Works of Art Commission, during the periods in which those federal agencies were in operation. When the federal agencies were discontinued during the first quarter of 1934, their work was taken over by the state commission, which provided the Museum with assignees throughout 1934, and is continuing such assignments this year.

The highest number of workers assigned to the Museum at one time during 1934 was 86; the lowest number 8; the average through the year was 40. Total number of working hours of the assignees to the Museum, in the aggregate, was 43,172 during 1934; the average number of working hours per week was 830. The kinds of work performed have been multifarious in scope.

In the Department of Anthropology 6,000 photographs have been mounted and captioned, more than 800 ancient Peruvian fabrics have been mounted on linen, more than 9,000 potsherds washed and numbered, and 4,000 classified and mounted; and a vast amount of typing, indexing, preparing of catalogue cards, and other clerical work has been done.

In the Department of Botany 35,000 packets for plant specimens have been made, 60,000 herbarium specimens of plants have been mounted, 35,000 index cards prepared, several thousand leaves made in the plant reproduction laboratories; and a great amount of work has been done on the wood collections, in preparation of dioramas, on drawings and lettering, and on records, etc.

In the Department of Geology more than 13,500 catalogue cards have been typewritten, 1,600 specimens have been numbered, a large amount of manuscript copied, some fossils have been mounted, and some research projects undertaken.

In the Department of Zoology more than 15,000 index cards, labels and other typewriting items have been done, some 4,000 birds have been catalogued, 8,000 fishes tagged, nearly 3,000 skulls cleaned, 1,200 insects pinned, and miscellaneous other routine work has been accomplished.

From two to twelve printers have been assigned to the Division of Printing, where they assisted in the type composition and other work on publications, exhibition labels, etc. Some 12,800 photographic prints were made by relief workers in the Division of Photography, and 30,500 catalogue cards were prepared. A vast amount of clerical work of varied kinds was performed by relief workers in the Library, the Division of Publications, Division of Public Relations, Division of Memberships, and Raymond Foundation. In the Maintenance Division ten relief workers assisted the Museum forces in various tasks.

In Memoriam

With regret, Field Museum takes notice, belatedly, of the death of Louis Charles Watelin, who for several years was field director of the Field Museum-Oxford University Joint Expedition to Mesopotamia, which made important archaeological excavations on the site of the ancient city of Kish, in Iraq. Mr. Watelin's death deprives Near East archaeology of one of its foremost figures, and Field Museum of a loyal friend and scientific collaborator.

Botanical Project to Resume

J. Francis Macbride, Assistant Curator of Taxonomy in the Department of Botany, sailed for Europe January 30 to resume the work of the joint botanical project of the Rockefeller Foundation and Field Museum. He had been in this country for several months on a visit for the first time since the European work was undertaken five years ago. The project has for its purpose the making of photographic negatives of type specimens of plants, chiefly South American, which are preserved in European herbaria. From these negatives, prints are made available for studies by botanists everywhere, and are proving of great value in the advancement of systematic botany. Thus far, more than 30,000 negatives have been made.

2,650,000 PERSONS SERVED BY MUSEUM IN 1934

The educational influence of Field Museum was carried to a total of more than 2,650,000 persons during 1934. This figure includes 1,991,469 visitors received during the twelve months in the Museum building itself, and approximately 662,000 persons, mostly children, reached by extra-mural educational activities conducted by the institution through the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures, and the Department of the N. W. Harris Public School Extension.

The Harris Extension circulates some 1,300 traveling exhibits among more than 400 schools and other institutions of Chicago where they are available for study daily during the school year by more than 500,000 children.

The activities of the Raymond Foundation include outside work by lecturers sent to the children's classrooms and assemblies to give talks on natural history subjects, illustrated with lantern slides. These extension lectures were heard by 162,360 children in 1934. The Foundation presents also series of motion picture entertainments in the James Simpson Theatre which were attended by 27,653 children in 1934, and guide-lecture tours of the exhibits in which the participants last year numbered 14,759.

The lectures for adults in the Simpson Theatre in 1934 were attended by 24,326 persons, and 8,807 participated in the guide-lecture tours for adults. The Library of the Museum, and the scientific study collections maintained in the various Departments, served a large number of people.

While the Museum attendance of 1,991,469 persons shows a large decline from the 3,269,390 visitors received during 1933, it was nevertheless the second highest year's attendance in the history of the institution, and the reduction from the 1933 peak was a natural and expected consequence of the smaller attendance at A Century of Progress exposition in its second year. Of the visitors in 1934 only 99,553, or approximately 5 per cent, paid the 25-cent admission fee charged on certain days; all the rest either came on the days when admission is free, or belonged to classifications such as children, teachers, students, and Members of the Museum, to whom admission is free on all days.

ACANTHUS PLANT INFLUENCED ANCIENT CORINTHIAN ART

By B. E. Dahlgren
Curator, Department of Botany

There has been added recently to the exhibits in the Hall of Plant Life (Hall 29) a reproduction of the bear's breech (*Acanthus mollis*), shown in the accompanying illustration. This is one of several species of robust herbaceous plants native to the Mediterranean region, and often grown, especially in southern Europe, Greece, Italy, Spain and southern France, for ornament on account of their handsome foliage. The species shown here, or the closely related *Acanthus spinosus*, evidently served as the model for the ornamentation of the capitals and cornices of Corinthian architecture. The legend is that Callimachus, famous artist of the fourth to fifth century B.C., derived the idea of this form of capital from the sight of a basket on a maiden's tomb, covered with a tile about which the leaves of a plant of acanthus had grown. The conventionalized acanthus motif has ever since constituted one of the chief characteristics of the Corinthian as well as of the later Roman composite order of architecture, and has passed on in varied form into Byzantine and Renaissance art, where it was used both alone and combined with other plant forms.

The genus *Acanthus*, with about twenty species in southern Europe, northern Africa, and Asia, has given its name to the family Acanthaceae, which includes some 175 other genera and perhaps 2,000 species of plants, indigenous mostly to tropical and warm temperate regions of the world.

Acanthus

Reproduction of decorative plant recently added to exhibits in Hall 29.

Among them are many well known ornamentals, such as the Thunbergias, tropical climbers of various species. The handsome *Sanchezia nobilis* or "hoja de independencia" (leaf of independence) of Ecuador is exhibited in the same case as the acanthus.

HALL OF RACES COMPLETED

With the addition last month of a bronze bust of a Beduin, Chauncey Keep Memorial Hall (Hall of the Races of Mankind) is now complete. The series of sculptures in bronze and stone representing diverse racial types from all parts of the world now numbers ninety-one studies (including several groups which bring the number of individuals portrayed to 101). All are life-size. A large number of them are full-length figures; the remainder are busts and heads. All are the work of the sculptor Malvina Hoffman.

Captain White Visits Museum

Captain Harold A. White of New York, who led the Harold White–John Coats Abyssinian and the Harold White–John Coats African Expeditions of Field Museum, was a visitor at the Museum about the middle of January. Among groups in this institution resulting from his collecting are the African water-hole, the bongo, and the aardvark, in Carl E. Akeley Memorial Hall (Hall 22).

Fishermen going south this winter to Florida and other gulf coast waters can become acquainted in advance with the various species of fish they may encounter by viewing the exhibits of gulf fishes in Albert W. Harris Hall (Hall 18).

LIBRARY OF DR. LAUFER GIVEN TO MUSEUM

The late Dr. Berthold Laufer, Curator of the Department of Anthropology, who died last September, left his personal library of approximately 5,000 volumes, including much material of extreme rarity and value, chiefly on China and Tibet, to Field Museum. Dr. Laufer had planned for many years to make this bequest, and completed the formal arrangements for it as far back as 1923.

This accession, with other Orientalia previously on the shelves of the Museum Library, makes the Museum's collection of books and pamphlets on the many subjects covered one of the most important in this country. Dr. Laufer's contribution includes books in Chinese, Tibetan, Mongolian, and in various European languages as well as in English. They were used by him in his researches and other work for the Museum.

Friends of China Memorial

As a memorial to Dr. Laufer, the American Friends of China, Chicago, have made a gift of $500 to the Museum, to be used for expenses in connection with the cataloguing and arrangement of his library in a manner that will increase its usefulness and convenience to scholars and others who wish to consult it. This society, of which Dr. Laufer was Secretary and one of the most active members, has over a period of years made many contributions to Field Museum, both of valuable objects for the Chinese archaeological and ethnological collections, and of books for the Library.

A GREAT FOSSIL TURTLE

By Elmer S. Riggs
Associate Curator of Paleontology

The shell and the internal skeleton of a great fossil land-turtle, *Testudo* species, have just been mounted and placed on exhibition in Ernest R. Graham Hall (Hall 38). The specimen measures forty-eight inches in length. The shell alone is forty-two inches long by thirty-two inches wide.

This specimen was collected by a Museum expedition in 1931, from a sandy bluff above the North Platte River in western Nebraska. The upper shell was badly broken when found, but has been carefully pieced together, and missing parts have been restored. It is one of the largest specimens of fossil tortoise so far reported from North America.

Land-turtles of this genus are known to have lived as early as the Oligocene period (35 to 39 million years ago), and have since become widely distributed over the world. Species of *Testudo* are known from the Miocene formations of India where land-turtles appear to have attained their largest size. Other species have been found in western Europe, in Egypt, and in South America. Modern species still exist in various parts of the world.

Election of Officers

All officers of Field Museum who served in 1934 were re-elected for 1935 at the Annual Meeting of the Board of Trustees held January 21. For the twenty-seventh time President Stanley Field was re-elected. He has held office continuously since 1909. The other re-elected officers are Albert A. Sprague, First Vice-President; James Simpson, Second Vice-President; Albert W. Harris, Third Vice-President; Stephen C. Simms, Director and Secretary; and Solomon A. Smith, Treasurer and Assistant Secretary. The membership of the Board of Trustees remained unchanged.

RAYMOND FOUNDATION TO GIVE TWO SPECIAL PROGRAMS

In commemoration of the birthdays of Abraham Lincoln and George Washington, two special programs of free motion pictures for children will be presented at the Museum in February under the provisions of the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

The Lincoln program will be given on Tuesday, February 12, when two films, "Lincoln and His Mother" and "A President's Answer," will be shown. The Washington program, to be given on Friday, February 22, will feature the film "Washington, His Life and Times."

The regular spring series of Raymond Foundation programs on Saturday mornings will begin on March 2, when three films, "The Pygmy Circus," "American Bears," and "A Trip to Washington, D.C.," will be presented. In this series there will be eight other programs. Details of the complete schedule will appear in the March issue of FIELD MUSEUM NEWS.

In order to accommodate larger numbers of children all of the Raymond Foundation programs, both special and regular, are presented twice, the first showing beginning at 10 A.M. and the second at 11 A.M. Children from all parts of Chicago and suburbs are invited to attend.

WILLIAM FINLEY TO LECTURE AT MUSEUM MARCH 2

Dr. William Finley, of Portland, Oregon, noted for his explorations in the far north, will appear at Field Museum on Saturday afternoon, March 2, in a lecture for adults to be presented in the James Simpson Theatre. "Birds, Bergs and Kodiak Bears" is the title of the lecture, which will be illustrated with motion pictures of a very high order. The lecture will begin at 3 P.M.

This is the first of nine lectures to be presented in the sixty-third course under the auspices of the Museum. The other lectures will be given on succeeding Saturdays in March and April. The complete schedule of dates, subjects and speakers will be announced in the March issue of FIELD MUSEUM NEWS.

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats on request. Requests for these seats may be made by telephone or in writing to the Museum, in advance of the lecture, and seats will then be held in the Member's name until 3 o'clock on the day of the lecture. Members may obtain seats in the reserved section also by presentation of their *membership cards* to the Theatre attendant before 3 o'clock on the lecture day, even though no advance reservation has been made. All reserved seats not claimed by 3 o'clock will be opened to the general public.

Meteorite Casts Available for Sale or Exchange

The Museum has on hand 100 plaster casts of meteorites which are now available to other institutions or individuals by sale or exchange. These casts were formerly an important part of the Museum's collections pertaining to meteorites, but as the Museum has accumulated original specimens representing more than 700 meteorites the casts have been gradually withdrawn from exhibition. They are still of great interest and value for addition to smaller collections containing inadequate numbers of genuine meteorites. The Director of the Museum will be glad to send complete information to any institution or individual interested.

THE TIBETAN GOD OF DEATH

By J. ERIC THOMPSON
Assistant Curator of Central and South American Archaeology

A colorful statue of Yama, the Tibetan god of death, presented to the Museum by William E. Hague, has been placed on exhibition in Hall 32. The statue, which is five feet high, is made of lacquered papier maché and wood. As is usually the case with this deity, Yama is shown wearing a crown and necklace, the ornaments of which

Yama, God of Death

Unusual statue of Tibetan deity, made of lacquered papier maché and wood, on exhibition in Hall 32.

are made of papier maché in the form of human skulls. The god's hair is represented as flames, and a tiger's skin is draped around his loins. In the center of his forehead is the "eye of wisdom," with which he was supposed to see into the past and future. All of these are special attributes by which this god can be recognized. He is usually painted green, and dressed in red, but in this statue his body is lacquered red, and his clothing is green. Like most Tibetan deities, Yama has his origin in India. According to Indian legend he was the first mortal to die. Subsequently he was made one of the two rulers of the next world, his co-regent being the Hindu god Varuna. In the legend the road to his abode in the underworld is guarded by two ferocious dogs, past which the dead are advised to hurry. These dogs are his messengers.

The statue of the god stands on a pedestal, the upper tier of which has a cloud design, while the lower tier carries a typical lotus design. In accordance with a general Tibetan custom, various offerings had been placed inside this pedestal, which is hollow. These consist of small jars of barley and other grains, prayer rolls, and books of magical formulae, such as drawings of the eight emblems of happy augury. Offerings of this nature are believed to bring images to life, and consequently enable them to answer prayers.

The curious camel-like guanacos of South America are represented by an excellent habitat group in Hall 16.

FEBRUARY GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for February:

Friday, February 1—Chinese Exhibits.

Week beginning February 4: Monday—Animal Families; Tuesday—Hall of Plant Life; Wednesday—Races of Mankind; Thursday—General Tour; Friday—Man Through the Ages.

Week beginning February 11: Monday—North American Bird Groups; Tuesday—The Eskimos; Wednesday—Crystals and Their Uses; Thursday—General Tour; Friday—Habitat Groups.

Week beginning February 18: Monday—Primitive Life of Africa and Madagascar; Tuesday—Plants of the Lower Orders; Wednesday—Ancient Burials; Thursday—General Tour; Friday—Prehistoric Life.

Week beginning February 25: Monday—Melanesian Hall; Tuesday—Plant Products; Wednesday—Minerals and Ores; Thursday—General Tour.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in FIELD MUSEUM NEWS. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Mrs. Laura C. Boulton—18 musical instruments, Africa; from Percy Williams—5 fruits of *Hyphaena crinita*, South Africa; from S. C. Johnson and Son, Inc.—9 samples of vegetable waxes; from Henry Field—9 specimens of minerals, 60 fossils, 6 rocks, vertebra, jaws, and teeth of *Ichthyosaurus*, Germany and England; from S. W. Pruitt—a specimen of tin ore and 118 specimens of minerals, North Carolina and Georgia; from Mrs. A. E. Burnaby—4 English adders, 3 bats, a weasel, 5 moles, and a water rat, England; from Leslie Wheeler—14 specimens of birds, including falcons, hawks, owls, and a black merlin, Colorado, Florida, Iowa, Oregon, and British Columbia; from Albany Museum—3 lizards, South Africa.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from December 17 to January 15:

Life Members

Albert B. Dick, Jr.

Associate Members

Frederic Burnham, Harry J. Dunbaugh, Mrs. Frank P. Hixon, John McWilliams Marsh II, Karl Newhouse.

Annual Members

Miss Mary S. Bissell, James Bonfield, A. B. Clark, Otto Donath, Mrs. William F. Dummer, Mrs. Ralph S. Greenlee, G. I. Mackenzie, Miss Jeannette Brown Obenchain, John P. O'Shaughnessy, George A. Riel, John E. Schulze, Thomas F. Tansey, George L. Teller, Mrs. Peter S. Theurer, Mrs. W. B. Thompson, C. E. Varley.

Rare Waxes Received

Through the kindness of H. F. Johnson, Jr., there were recently received from S. C. Johnson and Son, Inc., of Racine, Wisconsin, a number of rare or unusual waxes of vegetable origin, including sugar cane wax, coffee wax, tea wax, wax of orange blossoms, of cassia, mimosa, lavender and jasmine flowers. Some of these are by-products of the perfume industry. They are all of interest as indicating the widespread occurrence of waxes in the plant kingdom, and will be added to the exhibits of vegetable waxes in Hall 28.

An exhibit representing the citrus fruits, and the flowers, woods, foliage and products of the trees of the orange family, is on view in the Hall of Plant Life (Hall 29).

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WHEN WINGED REPTILES FLEW IN THE AIR, AND GIANT LIZARDS SWAM THE SEAS

By Elmer S. Riggs
Associate Curator of Paleontology

A scene from the ancient inland sea which extended over the Great Plains region of North America in the Cretaceous period, 90,000,000 years ago, forms the subject of one of the large mural paintings by Charles R. Knight exhibited on the walls of Ernest R. Graham Hall (Hall 38) of Field Museum. At the bottom of this Cretaceous sea accumulated great beds of shells and of clay which later became the well-known chalk beds of western Kansas and the shale formations which extend from Texas far northward into the Arctic regions. In these formations are found the fossil remains of many strange forms of life which lived in and about that ancient sea.

One of the queer denizens of that far-off time, shown in the accompanying illustration, is the great swimming lizard or Mosasaur. This animal is known from abundant fossil remains in this museum and others. It is distinguished by the long, tapering head, pointed snout, and thickly set rows of conical teeth in the jaws and in the roof of the mouth as well. The body was rounded, and armed with paddle-like flippers, similar to those of the sea-lion. The tail was long and flexible, and bordered with fins above and below. The Mosasaur, a strong swimmer, was voracious in its habits, feeding on fishes and other kinds of marine life.

Found in the same chalk and shale beds are fossil remains of slender-necked sea-lizards, great sea turtles, fishes of great diversity, and flying reptiles of strange and grotesque form.

Of marine turtles there was also variety. The gigantic *Archaelon*, seen in this painting, which reached a length of more than ten feet, was not very different in general characteristics from the modern leatherback turtle. Its head was armed with a strongly curved beak; the leathery shell was supported by a thin bony skeleton; the legs were adapted to the swimming habits of the animal. A splendid specimen of this great turtle is preserved in the Peabody Museum of Yale University.

The flying reptiles or Pterodactyls illustrated in this picture have often been called "flying dragons," and truly no creature, either ancient or modern, could more accurately fill the conception of this fabled monster. Those of Cretaceous times had a wing-spread reaching more than twenty-one feet. The head was armed with a pointed beak nearly a yard in length and entirely devoid of teeth. A flattened crest projected far back from the top of the head. The wings consisted of elongated arms and fingers from which thin membranes extended to the sides of the body. The breastbone was flat and offers no evidence of the strong pectoral muscles so conspicuous in birds of flight. The legs were short and relatively weak, apparently of service only in the act of perching.

The long bones of both wings and legs were hollow and had walls of paper-like thinness. The entire structure of the animal is such as would enable the animal to attain the greatest strength consistent with the lightness and mobility necessary for flight.

The name Pterodactyl, signifying wing-finger, is descriptive of the wings, of which the outer half was supported by an elongated fourth finger or digit. Three slender claws, which appear at the angle of the wing, are vestiges of the forefoot. They correspond to the first three fingers of the human hand. They were apparently of service to the animal in enabling it to suspend itself from branches of trees or from rocky cliffs after the fashion of bats.

The Pterodactyl was, as its structure clearly shows, a strong flyer and a predacious feeder. It doubtless swept over the open seas, scanning the water for fish and diving swiftly to seize such prey. The wide distribution of the animal's fossil remains over deep-sea beds of marine origin gives unmistakable evidence of its adventures over the open sea.

A specimen of one of the smaller kinds of Pterodactyls, *Nyctosaurus*, exhibited in this museum, is one of the most complete skeletons of flying reptile known. The delicate bones, appearing on the surface of the natural chalk in which they were preserved, show with nicety of detail almost every feature of the animal's skeletal structure.

Mural Painting, by Charles R. Knight, of Flying and Swimming Reptiles

Extinct North American animals that lived 90,000,000 years ago. The Mosasaur, great swimming lizard in the foreground, grew to a length of thirty feet. The great sea-turtle on the right was of a species which reached ten feet in length. The Pterodactyls or flying reptiles seen in the air had wing-spreads more than twenty-one feet.

Trustee Wheeler Elected Contributor and Member of Museum Staff

In recognition of his many generous gifts of valuable specimens for addition to the bird collections of the Department of Zoology, Trustee Leslie Wheeler has been elected by his fellow members of the Museum's Board of Trustees to the class of membership in the institution designated as Contributors. In addition, Mr. Wheeler has been appointed Associate in Ornithology on the staff of the Museum because of the active interest he has taken in the work on birds. Mr. Wheeler is specializing in scientific work in connection with the birds of prey, and the Museum's collection of various species of these from many parts of the world has been placed in his charge.

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

MUSEUM'S BIRD COLLECTIONS HOLD 100,000 SPECIMENS

By Rudyerd Boulton
Assistant Curator of Birds

The bird collections of Field Museum today comprise approximately 103,000 specimens, of which about two-thirds are of New World species, and one-third Old World. In the exhibits in the two halls devoted to birds, Halls 20 and 21, are some 2,000 birds; about 1,000 are included in 350 small habitat groups circulated among the schools of Chicago by the N. W. Harris Public School Extension of Field Museum; and about 100,000 are in the study collections of the Department of Zoology.

The nucleus of these collections consisted of a thousand mounted specimens which had been exhibited by Ward's Natural History Establishment at the World's Columbian Exposition in 1893. In 1894 the Museum's first expedition to collect birds was dispatched to San Domingo in charge of George K. Cherrie. Soon thereafter the famous Cory Collection was acquired, and Charles B. Cory became Curator of Birds, continuing at that post until his death in 1920. In 1898 D. G. Elliot and Carl E. Akeley made a collection of 500 birds in British Somaliland which to this day remains the only notable collection in America from that part of Africa.

By 1900 the Museum's collection contained approximately 27,000 specimens, and was growing at the rate of more than 1,000 a year. Until 1925 the birds were predominantly of New World species, the major accessions resulting from expeditions to northern South America and Central America, led by Wilfred H. Osgood, Ned Dearborn, J. F. Ferry, Stanley G. Jewett, M. P. Anderson, and Robert B. Becker.

In the past twelve years the Museum's bird collections have almost doubled in number of specimens, and have become more truly world wide in scope. The North American collections total about 28,000, including part of the Cory Collection, and later acquisitions known as the E. E. Armstrong Collection, W. E. Snyder Collection, and T. Grafton Parker Collection, as well as miscellaneous series.

Specimens from Middle America and the West Indies number 20,000. Half of these are from the Cory Collection. Nine thousand Mexican and Central American birds are largely the result of expeditions sent out by Field Museum. The most recent was the Leon Mandel Guatemalan expedition with Emmet R. Blake as ornithologist.

From South America there are about 20,000 birds, chiefly from Venezuela, Brazil and Peru. Chilean specimens, collected by Dr. Osgood, H. B. Conover and C. C. Sanborn, although numerically less than those of the aforementioned countries, represent about 95 per cent of the total bird fauna of the country. Ecuador, Bolivia, Colombia, Paraguay, Uruguay and Argentina are represented by about 3,000 specimens among which should be mentioned the Mogensen Collection from Argentina.

European birds are represented by about 4,000 skins, of which about half are from the Anton Fischer Bavarian Collection.

African birds number 8,000. One-quarter of these comes from the northeastern section, mainly as a result of collections made by Mrs. Delia Akeley, Dr. Osgood, the late Louis Agassiz Fuertes, and Alfred M. Bailey. From central Africa come another 2,000, chiefly those collected by Mr. and Mrs. Akeley in 1906, and by J. T. Zimmer on the Conover–Everard African Expedition in 1927. Bechuanaland is represented by a splendid series of birds obtained by the Vernay–Lang Kalahari Expedition. The recent Straus West African Expedition collected specimens from regions not represented in other American museums.

From China there are some 4,000 birds, mostly those collected by the James Simpson–Roosevelts Asiatic Expedition and the Marshall Field Zoological Expedition to China. Indo-China and Siam are well represented by 6,000 specimens, of which a large part was collected by the William V. Kelley–Roosevelts Expedition to Eastern Asia, and others by the well-known French zoologist, Jean Delacour. From India there are some 2,000 birds collected by Herbert Stevens and V. S. La Personne, and presented to the Museum by C. Suydam Cutting.

There are 5,000 birds from Australasia, including the Woodhead Australian Collection, and the collections made in various South Sea islands and New Guinea by the Cornelius Crane Pacific Expedition.

Field Museum is the repository for 290 type specimens of birds. Type specimens are those upon which first descriptions of newly discovered species are based, and thereafter are used in determining technical questions of identification.

The collection of bird skeletons numbers about 500 specimens representing 90 families and 250 genera. In the R. M. Barnes Collection of eggs of North American birds the Museum has one of the best known oological collections in this country, and one of the most truly representative of the fauna. Other collections in the Museum are the H. B. Conover Collection of Game Birds of the World, numbering some 11,000 specimens of 1,000 species, and the recently inaugurated Leslie Wheeler Collection of Birds of Prey of the World.

MODELS OF EXTINCT ANIMALS FOR SALE OR EXCHANGE

Field Museum offers for sale or exchange to other institutions or interested individuals two classic restorations of the extinct reptiles, *Ichthyosaurus* and *Plesiosaurus*, and a cast skeleton of the prehistoric mammal, *Megatherium*.

The reptile models are cast in plaster of paris and are mounted on handsome wooden bases. The originals are said to have been made by the eminent English geologist, Professor Waterhouse Hawkins. The models are of reptiles from the English and German Lias formations of early Jurassic age. The restoration of *Ichthyosaurus* is mounted on a base 3 feet 10 inches wide and 7 feet 10 inches long. That of *Plesiosaurus* is 3 feet 10 inches by 6 feet 2 inches. Both bases are 18 inches in height and are designed to rest on the floor. The models are smooth at the surface, painted a dark green color and do not reproduce the minute details of dermal markings.

The cast skeleton of *Megatherium* is 17 feet long and represents the animal standing on its hind legs, which are 11 feet high. It was made by Ward's Natural History Establishment. It is mounted on a base 15 feet 9 inches long, 5 feet 10 inches wide, and 18 inches high.

All these offerings are ready for exhibition, with accompanying labels giving full descriptions of the animals.

A large assortment of petroleum-yielding rocks and sands from widely scattered localities is on exhibition in Hall 36. The specimens are of varied character, and represent fields of various capacity ranging from some which yield only four barrels a day to others which yield 3,000 barrels daily.

AN ANCIENT PERUVIAN QUIPU

By J. Eric Thompson
Assistant Curator of Central and South American Archaeology

Ten years ago a collection of archaeological material from various parts of the world, then on deposit with the Chicago Historical Society, was purchased and presented to Field Museum by Messrs. Stanley Field, Henry J. Patten, and Charles B. Pike. The collection included a certain amount of Peruvian material, but as at that time there was no member of Field Museum's scientific staff who had an intimate knowledge of Peruvian archaeology, a number of knotted cords roughly rolled into a ball passed unnoticed.

Two weeks ago on removing this material from the poison room, where it had remained undisturbed for ten years, the writer was surprised to find in a woman's basket, jumbled up with thread, balls of yarn, and spindles, this series of knotted cords, which, on unraveling, proved to be a quipu.

A quipu consists of a long and fairly thick cord, from which dangle groups of subsidiary cords. On these subsidiary cords are knots of two types—overhand knots and Flemish knots. These knots served as numerals in reckonings, each overhand knot and each loop in a Flemish knot representing a unit. A decimal system was employed, the tens and hundreds being differentiated by the position of the knots on the subsidiary cords, as can be seen in the illustration. Those closer to the main cord represented hundreds; those farther removed represented tens. At the ends of some cords are knots representing single units.

Quipus were used by the ancient Peruvians for keeping accounts. Overseers used them for recording the quantity of tribute paid to the Inca, the tallies of flocks of llamas, the production of finely woven garments, and statistics such as births, deaths, and the numbers of young men available for military service.

Cieza de Leon, the Spanish historian, gives a long account of the use of quipus, of which one paragraph follows:

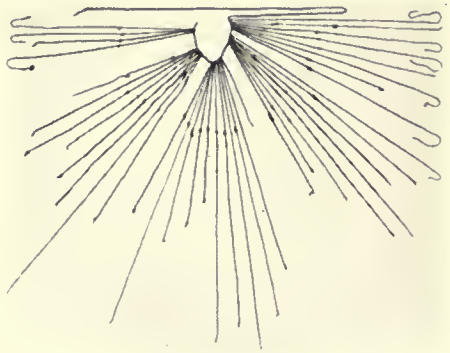
"Each province at the end of the year was ordered to set down in the quipus by means of knots, all the men who had died in it during the year, as well as all who were born. In the following year the quipus were taken to Cuzco [the capital of the Inca], where an account was made of the births and deaths throughout the empire. These returns were prepared with great care and accuracy."

A scheme of colored cords was used to aid the memories of the quipu keepers as to the subjects covered by the cords. However, quipus found in graves may never have been used for such purposes, since a buried quipu might fall into the hands of the spirits of evilly disposed persons, and might be used by them for harming the living. Furthermore these vital statistics were too important to be buried with the dead.

On the other hand, there is evidence strongly suggesting that the quipus, like the one in Field Museum, that were found in graves, belonged to magicians and astrologers. The sums recorded on these grave quipus frequently possess astronomical significance, some cords giving lunar data, others yielding calculations concerning the planet Venus or the solar year.

The Field Museum quipu has cords of various colors and a considerable number of knots. The calculations on this new quipu will shortly be checked to see if they possess astronomical importance, for complete specimens are very scarce, and new calculations of corresponding value. It is hoped to place the quipu on exhibition at the end of March.

Although the quipu was found in a woman's work basket at Field Museum, no information is available as to the conditions under which it was originally excavated. Nevertheless, it seems unlikely that a quipu would under normal circumstances be found in a woman's work basket.



Ancient Accounting Device

A quipu, used by the Incas of Peru in various kinds of computation. This rare object will make a notable addition to the Museum's exhibits pertaining to South American archaeology.

PREHISTORIC LIFE PICTURES IN BOOK BY C. R. KNIGHT

Reproductions of forty-five of Charles R. Knight's paintings and drawings restoring scenes of prehistoric life, including a large number of the murals presented to Field Museum by Trustee Ernest R. Graham and exhibited in Hall 38, are included in a book, *Before the Dawn of History*, published last month. The text, written by Mr. Knight, gives an outline of fossil types, the use paleontologists make of them, and their relation to various periods of earth's development. Mr. Knight describes the manner in which various early animals must have lived, and tells of his methods in reconstructing the life appearance of these creatures known only from skeletal remains.

The illustrations are arranged in chronological order with relation to the types and periods represented. Three stages of biological evolution are presented—that of the reptiles, that of the mammals, and that of early man. The book, published by the McGraw-Hill Book Company, New York, has 119 pages, 12 x 9. Copies are on sale at Field Museum. Price $2.50, plus 15 cents for postage if ordered by mail.

Noted Scientists Visit Museum

Professor Julian Huxley, noted British scientist and author, was a visitor at Field Museum on February 2. He conferred with members of the Museum staff, and inspected the Museum's zoological and anthropological collections. Professor Huxley is a grandson of the great biologist Thomas Henry Huxley. He is soon to take office as Secretary of the Zoological Society of London.

Dr. Roy Chapman Andrews, Director of the American Museum of Natural History, New York, and leader of the Central Asiatic expeditions of that institution during the period from 1923 to 1928, was a guest of the Museum on February 12.

Professor Ralph W. Chaney, paleobotanist of the University of California, recently came to the Museum to study the Herbarium collections in connection with studies of Tertiary fossil plants of the Pacific Coast.

HIBERNATION OF REPTILES

By Karl P. Schmidt
Assistant Curator of Reptiles

Many birds escape the rigors of winter by migrating to warmer climates in the south. Those that remain in our latitude through the cold season are able to find food by means of active habits, and are saved from freezing by the nearly perfect insulation afforded by their feather covering.

Mammals, like the birds, have warm blood and excellent insulation, and most of them survive the winter, without migration, by modification of their food habits or by subsisting on food stores laid up in times of plenty. Others, however, retire into burrows or hollow trees where, nourished by the slow consumption of their fat, they pass the winter in a state of suspended animation known as hibernation.

The frogs, toads, and salamanders, and the turtles, lizards, and snakes are "cold-blooded" as contrasted with the warm-blooded mammals and birds. Their body temperature is approximately the same as that of the air or water which surrounds them. These animals, accordingly, have no choice when the temperature falls toward the freezing point but to suspend their activity for the winter. Some, like the frogs and most turtles, bury themselves in mud in ponds or swamps. Highland forms, like toads and snakes and the box-turtle, bury themselves in sheltered situations in dry soil. The most familiar hibernating site of our Chicago snakes is beneath sidewalks, whence they emerge on warm days in November to sun themselves before their final retirement. Toads, which spend the winter in dry situations, migrate to water for the breeding season as soon as they emerge in spring. The two larger salamanders of the Chicago area have opposite habits in this respect. The tiger salamander (commonly called a "lizard") spends the summer on land, but hibernates in ponds and marshes. During September and October specimens are frequently found in cellar-ways and brought to the Museum for identification. Such openings are pitfalls for these creatures in their nocturnal travels. The spotted salamander lives in much the same situations through the summer, but spends the winter on land also, so that its migration to water for breeding and egg-laying takes place in the spring.

Many turtles do not lay their eggs until early summer, and these hatch as late as mid-September. When egg-laying or the development of the eggs is delayed for any reason, especially when a cool summer follows a late spring, the eggs do not hatch, and the embryo turtles may remain in the egg through the winter. If the winter is mild or if there is a sufficient covering of snow, such embryos come safely through this curious hibernation and emerge the following spring. Farmers engaged in spring plowing have frequently reported nests of turtle eggs with fully formed turtles in them, ready to hatch.

New Hybrid Plant Received

Field Museum has received, through Robert Van Tress, of the Garfield Park Conservatory, material of a handsome new plant developed recently by hybridization in the conservatory. The new hybrid, which has been named *Hippecoris Garfieldiana*, is the result of crossing the amaryllis (*Hippeastrum*) with a closely related genus, *Lycoris*. The very large flowers, much like those of amaryllis, are strikingly handsome because of their shape and red color.

SPRING LECTURE COURSE TO OPEN ON MARCH 2

Field Museum's Sixty-third Free Lecture Course will begin on March 2. Lectures on travel and science, illustrated with motion pictures and stereopticon slides, will be given on each of the nine Saturdays during March and April. All will be presented in the James Simpson Theatre of the museum, and all will begin at 3 o'clock in the afternoon. The complete schedule of dates, subjects and speakers follows:

March 2—Birds, Bergs and Kodiak Bears
Dr. William Finley, Portland, Oregon

March 9—The New Valley of 10,000 Smokes
Rev. Bernard R. Hubbard, S.J., University of Santa Clara, California

March 16—In the Shadow of the Eastern Gods
Robert Edison Fulton, Jr., New York City

March 23—Central American Trails
Captain John D. Craig, Hollywood, California

March 30—Modern Pioneering
Richard Finnie, F.R.G.S., Ottawa, Canada

April 6—Timbuktu and Beyond
Rudyerd Boulton, Assistant Curator of Birds, Field Museum; Leader of Straus-Field Museum West African Expedition

April 13—The West Indies
Major James C. Sawders, Nutley, New Jersey

April 20—The Canadian Rockies in Pictures and Story
Dan McCowan, Banff, Canada

April 27—The Buried Cities of Ceylon
Dr. Robert McMurry, New York City

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats on request. Requests for these seats may be made by telephone or in writing to the Museum, in advance of the lecture, and seats will then be held in the Member's name until 3 o'clock on the day of the lecture. Members may obtain seats in the reserved section also by presentation of their *membership cards* to the Theatre attendant before 3 o'clock on the lecture day, even though no advance reservation has been made. All reserved seats not claimed by 3 o'clock will be opened to the general public.

CHILDREN'S PROGRAMS OFFERED BY RAYMOND FOUNDATION

The spring series of free motion picture programs for children, presented by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures, will open on March 2. There will be nine programs in all, to be given each Saturday morning during March and April. All will be presented in the James Simpson Theatre of the Museum, and there will be two showings of the films on each program—one beginning at 10 A.M., and one at 11 A.M. Children from all parts of Chicago and suburbs are invited. They may come alone, in groups from schools and other centers, or with teachers, parents, or other adults. Following is the schedule showing the titles of the films to be shown on each date:

March 2—The Pigmy Circus; American Bears; A Trip to Washington, D.C.

March 9—Babies of the Farm; Jungle Belles; Australian Animals; A Dyak Wedding

March 16—The Orang at Work and Play; Javanese Farmers; Watching the Wayangs

March 23—Antelopes Seldom Seen; Daniel Boone and a New Trail

March 30—Wild Life at Home; Laying the World's Fastest Cable

April 6—Beetle Friends and Enemies; Trained Bird Fishermen; Glimpses of Quaint Gaspé

April 13—Monkey Capers; Jungle Vaudeville; Souvenirs of Singapore; The Wapiti of Jackson Hole

April 20—Mushrooms and Their Cousins; Peter Stuyvesant

April 27—Nature's Weavers; Life of a Moth; Mounting Butterflies; Algonquin Adventures

THE SAUSAGE TREE

Among the world's queerest trees is the sausage tree of East Africa, of which a specimen branch, with its odd fruits, is on exhibition in the Hall of Plant Life (Hall 29). It is a large tree of the trumpet vine group, to which the familiar catalpas belong. The fruits of the sausage tree, which bear a striking resemblance to the products of the meat-packing industry, hang from the branches on pendent stems from one to two yards long, much as sausages are hung for display in butcher shop windows. The fruits frequently reach a length of two feet.

Unfortunately, while the exterior of the tree sausages suggests edible qualities, the interior contains a hard and woody pulp which is neither palatable nor nutritious, and the fruits therefore are not likely to be in demand as a substitute for the delicatessen varieties of sausages.

Nevertheless, the sausage tree is not wholly useless. It is held sacred by Negro tribes in Nubia, and they hold religious festivals in the moonlight under its branches. Poles made from the trees are erected before the houses of great chiefs and are worshipped. As for the sausages themselves, the natives cut and roast them and apply the cut surfaces to their bodies as a remedy for rheumatism and similar complaints.

The trees are found principally in Nubia, Abyssinia, Mozambique, Natal, Senegal and Guinea. A few have been grown in the southern United States.

Related to the sausage tree is the candle tree of Central America, of which the Museum likewise exhibits specimens. The green and yellow fruits of this tree almost perfectly represent the shape and waxy appearance of candles. Some of these reach a length of four feet. They are eaten by cattle, but are not to be recommended as a fodder, since they give an unpleasant flavor to the meat.

The Museum exhibits include other interesting members of the trumpet vine family, among them the calabash of the American tropics, from the fruits of which natives make bottles and floats for fishing nets, and the beautiful "nymphs' comb" of Yucatan whose winged seeds are described by botanists as among the most efficient of "vegetable airplanes" because of the way they sail through the air.

Dr. Laufer Posthumously Honored

In recognition of the bequest to Field Museum of his valuable library of some 5,000 volumes, which was reported in the February issue of FIELD MUSEUM NEWS, the name of the late Dr. Berthold Laufer, former Curator of Anthropology, has been added to the list of Contributors to the Museum—those whose gifts in money or materials range in value from $1,000 to $100,000.

MARCH GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for March:

Friday, March 1—Primitive Musical Instruments.

Week beginning March 4: Monday—Uses of Plant Fibers; Tuesday—Men of the Stone Age; Wednesday—Systematic Collection of Mammals; Thursday—General Tours; Friday—Egyptian Exhibits.

Week beginning March 11: Monday—Plants and Animals of the Past; Tuesday—Totem Pole Makers; Wednesday—Copal, Amber and Turpentine; Thursday—General Tour; Friday—Crystals and Their Uses.

Week beginning March 18: Monday—China and Tibet; Tuesday—Chicago Birds; Wednesday—Peoples of the South Seas; Thursday—General Tour; Friday—Native Trees, Fruits and Vegetables.

Week beginning March 25: Monday—American Archaeology; Tuesday—Deer and Antelopes; Wednesday—Jades and Their Uses; Thursday—General Tour; Friday—Moon and Meteorites.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in FIELD MUSEUM NEWS. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Joseph C. Belden—a shrunken Jivaro Indian head, Ecuador; from Professor Manuel Valerio—43 herbarium specimens, Costa Rica; from School of Forestry, Yale University—239 herbarium specimens, Brazil, New Guinea, and Ecuador; from Hermann C. Benke—215 herbarium specimens, Illinois and Wisconsin; from Armando Dugand G.—a Bauhinia stem, Colombia; from Wisconsin Land and Lumber Company—a board of tamarack, Michigan; from Professor A. O. Garrett—76 herbarium specimens, Utah; from Charles Weight—a specimen of lepidodendron, Pennsylvania; from K. Ogaki—a specimen of cahochon cut amber with insect, Manchukuo; from Walter L. Necker—52 salamanders, 2 anakes, and 3 toads, Indiana; from Russell Abel—a snake-eel; from John G. Shedd Aquarium—a hawksbill turtle, Bahama Islands; from W. R. Thomas—19 mammal skulls, South Dakota; from Chicago Zoological Society—2 mammals and 11 birds, Australia and Galapagos Islands; from A. J. Franzen—a badger skeleton, Wisconsin; from E. Morton Miller—4 anakes, 3 frogs, and 2 toads, Florida.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from January 16 to February 15:

Contributors
Leslie Wheeler

Non-Resident Life Members
Herbert F. Johnson, Jr.

Associate Members
Mrs. Idea L. Hammond, Arthur E. Neumann, Dr. Theodore Stanley Proxmire, R. H. Van Schaack, Jr., Mrs. N. L. Tibbetts, Mrs. Ezra J. Warner.

Annual Members
William Scott Bond, E. B. Boyd, Eugene A. Bournique, Mrs. Edison Dick, Mrs. Herbert S. Eckhouse, Emil Eitel, Maurice Friedlander, Fred B. Hamm, Miss Jean Hutchison, Dr. Charles E. Kahlke, W. G. Kindsvogel, William G. Kress, Henry Manaster, Mrs. A. Howard McConnell, William Wallace Rice, John C. Richert, Emil W. Ritter, Harry E. Seanor, Frank K. Shrader, Cochran Supplee, Miss Lucille C. Thompson, Mrs. Flora Van Artsdale, George Vivian, Mrs. Wallace Wakem.

Panama Society Honors Standley

Associate Curator Paul C. Standley has been elected an honorary member of the Panama Canal Zone Natural History Society.

Many of the market fishes of Chicago are exhibited in Albert W. Harris Hall (Hall 18).

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AXIS DEER HABITAT GROUP IN W. V. KELLEY HALL

By Wilfred H. Osgood
Curator, Department of Zoology

The latest addition to the series of habitat groups in William V. Kelley Hall of Asiatic Mammals (Hall 17) has for its subject the well-known axis deer. Other names for the species are spotted deer, as it is sometimes called in books, and chital or cheetal, which in Hindustani means spotted and is used by natives and shikaris in India. The name axis, although thought by some to be of East Indian origin, was first applied in this connection by the great Roman naturalist, Pliny the Elder. Later, it was formally given as the technical name of the species and from this it has come into general use, although its original significance is not quite clear.

This animal has been chosen by some as the most beautiful member of the deer family and, although many will not agree to this, it must at least be taken as an indication that it has some claims to the distinction. With certain exceptions, such as the moose, which scarcely contends, all members of the deer family are beautiful and the selection of any one for first place is not an easy matter. The axis deer is neither a large deer nor a very small one. It has neither the magnificence of the stately wapiti nor the slender grace of the roebuck. Its charm is mainly in its soft-colored, spotted coat and its demure refined demeanor.

The axis deer is common throughout most of peninsular India and Ceylon but does not extend into adjoining parts of Asia. Although less numerous than formerly, it maintains itself in considerable numbers since it has the ability to thrive in close proximity to man. Like our own white-tailed deer, it needs only a small tract of woodland or thicket for cover and retreat. It is a highly social species, however, and where conditions permit, it is given to forming large herds, sometimes numbering hundreds. It frequents hill districts and plains alike, but does not wander far from water. Like some other deer, it has a loud scream of alarm and a barking sort of call.

The spotted coloration of this deer is retained at all seasons and all ages. This is very unusual for, although many deer are spotted when young, in nearly all cases the spots disappear in the adult. It is thought that the spots serve to make the young less conspicuous by producing a broken or "interrupted" pattern corresponding to alternating light and shade in the forest. As a possible substantiation of this theory, it is pointed out that probably all deer were once spotted throughout life for protection from enemies, but as the need for this protection lessened there has been a tendency for the spots to disappear. Thus we now find that in deer of open plains or those that have attained large size and ability to defend themselves, there are no spots in either young or adults. In others, as in American deer, the spots are retained in the young but not in the adults, the assumption being that the advantage to the grown animal is no longer necessary. The axis deer is one of the very few species in which the spots are permanent.

Axis Deer or Chital

This species of deer, native to India and Ceylon, is notable for its beauty and its permanently spotted coat. The Museum specimens were collected by the James Simpson–Roosevelts Asiatic Expedition, and the late Colonel J. C. Faunthorpe. Staff Taxidermist C. J. Albrecht and Artist C. A. Corwin prepared the group.

The new group has unusually fine pictorial quality and pleasing color tones. The deer are represented in light tropical forest quietly resting at mid-day. A fine stag stands at one side in somewhat complacent attitude while a younger stag and two does with a pair of fawns are lying down on a leafy forest bed. The specimens were obtained from two sources, some from Colonel Theodore Roosevelt and Kermit Roosevelt during the James Simpson–Roosevelts Asiatic Expedition, and some from the late Colonel J. C. Faunthorpe, of Bombay, a noted sportsman.

The group is the work of Staff Taxidermist C. J. Albrecht, and Artist Charles A. Corwin.

THE FOSSIL RHINOCEROSES OF NORTH AMERICA

By Elmer S. Riggs
Associate Curator of Paleontology

Ordinarily rhinoceroses are thought of as belonging to Africa and India along with elephants and lions. The number of fossil skeletons of various species of rhinoceroses found in this country show, however, that these great pachyderms were once at home in North America. Not only were they at home here, but common and abundant over a great part of the continent.

In Eocene time (about 45,000,000 years ago) they were beginning to appear on the plains of Utah and Wyoming along with the four-toed horse. In Oligocene time (about 35,000,000 years ago) they are known to have been numerous in the great plains region about the Black Hills where they adapted themselves as ordinary plains and woodland animals, as swift-footed runners, and as heavy-bodied river animals. In Miocene and in Pliocene times, (the former about 20,000,000 and the latter about 8,000,000 years ago) they reveled about the rivers which flowed eastward across the plains of Kansas and Nebraska.

A mounted skeleton and several skulls and legs of rhinoceroses of different kinds are exhibited in Ernest R. Graham Hall (Hall 38). Some of them are from the "bad lands" of South Dakota, others are from the old river channels and from the drifted sands of Nebraska and Kansas. There these animals appear to have died out as the great plains region became colder and more arid with the approach of the ice age.

Extinct Birds Exhibited

There has been installed in Hall 21 a special exhibit showing eight of the extinct birds of North America. The specimens were prepared by Staff Taxidermist Ashley Hine. This is the first installation in a series of biological exhibits of birds. A full account of it will appear in the May issue of Field Museum News.

Remarkable examples of inlaid work in shell, fashioned by natives of the Solomon Islands in the South Pacific, provide an interesting study of primitive art in Joseph N. Field Hall (Hall A).

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

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FIELD MUSEUM NEWS

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Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

TALC AND TALCUM POWDER

Talc is a mineral which finds many uses on account of its extreme softness and unctuousness. It is so soft that it is readily scratched by the finger nail and feels as slippery as if it had been greased. Its familiar use as talcum toilet powder depends on these properties as well as the absence of grit and the fact that it does not cake or become plastic when wet.

Talcum powder is the pure mineral ground to powder and perfumed. Sometimes a little borax is added as a mild disinfectant. Other somewhat harder and less unctuous minerals such as serpentine and gypsum are sometimes substituted for the talc, and chemical products are sometimes substituted for special purposes. In Colonial times our grandmothers used fuller's earth as baby powder.

Talcum powders account for but a small part of the talc used. For every pound of talc ground for talcum powder forty pounds are used in other ways. More than a third of the talc mined is used as a paper filler to give body to paper, nearly a quarter of it goes into paint, and it has some sixty other uses.

Talc is a hydrated silicate of magnesia formed by the alteration of older magnesian minerals. A corresponding hydrated silicate of alumina formed by alteration of aluminous minerals, and called pyrophyllite by mineralogists, is so like talc in appearance and physical qualities that it can hardly be told from it and is not distinguished from it in commerce. Most talc is a dull, ordinary looking mineral, massive, granular or fibrous in texture and white, green, gray or brown in color although there is a foliated bright green talc which is quite attractive. Deposits of talc are widely distributed over the earth and are found in nearly every country.

Specimens of talc from many parts of the world occupy half a case in Hall 36.

—H.W.N.

PHEASANTS AND RELATED BIRDS ADDED TO EXHIBITS

Most birds, as almost anyone has observed, have very marked parental instincts, evidenced by their care of their eggs before hatching, their feeding of the young, and other habits. These instincts, however, are apparently totally lacking in the megapodes or mound builders of Australasia and the East Indies, specimens of which were recently placed on view in a new case of pheasants and related birds added to the systematic series in Hall 21. Some forty-two species of the principal pheasants, grouse, quail, partridges and curassows of the world, among them a number of rare species, are included in the new exhibit.

The megapodes, according to Rudyerd Boulton, Assistant Curator of Birds, lay their eggs in the sand, partly buried in twigs, leaves, and the sand itself. There they immediately abandon them. The eggs are hatched by the heat of the sun or of decaying vegetation. The young birds come out of their shells into the world without ever seeing or knowing their parents. They are born with wings well developed, and are otherwise able to take care of themselves from the very beginning. Within a day or two after hatching they are able to fly.

Practically all important birds of the order which includes the pheasants are represented in the new exhibit, with the exception of the North American varieties which are shown separately in a previously installed exhibit near-by. The new mounts are the work of John W. Moyer, of the Museum's taxidermy staff.

Among other birds of special interest in the collection are the hoactzin of Central and South America, notable for the hooks on its wings and feet, and its habit of crawling like a lizard, thus furnishing important evidence of the reptilian ancestry of birds; the very rare Derby's mountain guan which is found nowhere in the world except in a restricted area of Guatemala where specimens were collected for the Museum by the Leon Mandel Guatemala Expedition; and Reeve's pheasant, a Chinese species whose tail sometimes reaches six feet in length, first described by Marco Polo.

Likewise of note in the collection are the capercaillie, largest grouse of the world; the golden and Lady Amherst pheasants, most brilliantly colored of all; the ocellated turkey with its showy iridescent coloration; the Chinese bamboo partridges, often caged by natives who credit their loud calls with magical power; the Nepal Kaleege pheasant of Asia, never observed in its native habitat by any white man because it ranges through a district barred to the Caucasian; and the Ceylon jungle fowl, closely related to the red jungle fowl from which all varieties of domestic chickens have been derived.

Some of the birds were collected by the William V. Kelley–Roosevelts Expedition to Eastern Asia. Some were presented by W. G. Clegg of Delamere, England, and James Simpson of Chicago.

Musical Instruments from Nigeria

Appreciation of music, and particularly of rhythm, is basic in the lives of African Negroes. In Hall D is a collection of musical instruments and dancing regalia collected in Nigeria, west Africa, by the Frederick H. Rawson–Field Museum Expedition of 1929–30. Various types of drums are shown. A particularly interesting example is one made by stretching a hide over the mouth of an earthenware pot.

Wind instruments include slender reed pipes, side-blown horns that give out deep booming notes, and an example of the *algaita*, which is a kind of flute with four stop-holes and a brass mouthpiece. The best of the stringed instruments is made from a gourd which is covered with snake skin. The strings of the instrument, as well as the strings of the small bow with which it is played, are made of horsehair.

Among the ceremonial objects are a well-carved wooden paddle for beating time, an ax that is carried over a dancer's shoulder, and a cap decorated with cowrie shells.

Dr. Herbert Weld is Dead

Dr. Herbert Weld, sponsor on behalf of Oxford of the Field Museum–Oxford University Joint Expedition to Mesopotamia, died in London on February 5, at the age of 83. He was a noted scholar in the history and literature of Abyssinia as well as in Assyriology. On the basis of observations he made during extensive travels in Mesopotamia the site of Kish was selected for the excavations conducted over a period of ten years by Oxford and Field Museum.

J. Eric Thompson Resigns

J. Eric Thompson, Assistant Curator of Central and South American Archaeology at Field Museum for a number of years, has resigned, effective from March 1, to accept a position on the staff of the Carnegie Institution of Washington, D.C.

BIRDS OF PREY RECEIVED

Trustee Leslie Wheeler has recently acquired for the Museum a number of birds of prey of great interest. One hundred and twenty-one specimens of hawks and owls from all parts of the world were carefully selected from a dealer's collection in London to fill gaps in the Museum's already notable collection. Fifty-nine species of hawks, represented by ninety-nine specimens, form a part of this recent acquisition. Among these, there are fifteen species and twenty-three geographical races not previously represented in the study collections, ranging from a pair of spotted eagles from the Balkans and a sea eagle from Japan to a pygmy falcon from east Africa.

The prizes of the collection are a pair of rare falcons, *Spiziapteryx*, meaning "sparrow-winged," from Argentina, which add a genus not previously in Field Museum's collections. There are also twenty-two owls belonging to twelve species, of which four species and five geographical races are new to the collection. Many rare birds from Madagascar, eastern Asia, Africa and South America are also included. —R.B.

MISTLETOE

By B. E. Dahlgren
Curator, Department of Botany

Thanks to an old English custom, deriving apparently from ancient Druid or Norse mythology, everyone is familiar with mistletoe which, like holly, is used at Christmas as a special festive decoration for the house. The mistle employed for this purpose in Europe differs from any American species but is sufficiently similar in general appearance to be instantly recognized as mistletoe. The jointed green stem, the pale or yellowish green thick leaves in alternating pairs, the clusters of small waxy white berries in the axils, suffice to make most of the northern mistles unmistakable, though in various particulars the species differ considerably from each other, some even being leafless or having the leaves reduced to small scales.

It would be a mistake, however, to assume, on the strength of this, that the mistles of other parts of the world are equally similar in appearance. More than 800 species are known and many of them, especially in the tropics where they are most numerous, present a very different aspect. Some have clusters of showy flowers, up to several inches in length, orange yellow to bright red in color, and violet-black or purple fruit, in some instances as large as olives.

A branch of a tropical species of mistle has recently been added to the exhibits in the Hall of Plant Life (Hall 29). This new addition is a faithful reproduction of a specimen obtained by the Marshall Field Botanical Expedition to the Amazon (1929) at a locality not far from the Ford Rubber Plantation on the Tapajoz River in Brazil. At the time of collection it was in flower and fruit as shown in the accompanying photograph. It was one of many clumps of mistle providing the major part of green foliage on a rather small tree, apparently greatly hampered in its growth by its bright-flowered parasitic inhabitants.

The parasitic habit is shared by almost all known species of mistletoe. Their berries are eaten by birds which, in cleaning their bills or otherwise, lodge the sticky seeds on the branches of trees. There germination takes place and the young plants attach themselves, either by a special disk or by sending penetrating root-like suckers through the bark. Various vernacular names meaning "bird-plant" and "bird-graft" have reference to this well-known mode of dissemination. In places where a wire fence exists near a mistletoe-laden tree, rows of seedlings may often be seen sprouting on the wire where they can have but a short existence. Normally the young mistletoe plant is assured from the beginning a favorable perch and a quota of nourishment from the sap of the host.

Though parasitic, the mistles are, however, never completely dependent on their host. As indicated by their green leaves they are only semi-parasites and manufacture for themselves a great part of their food, which is to their credit but does not prevent them from becoming in many places a serious pest. Northern species growing on conifers produce the abnormal formations called "witch's broom." One tropical species with long vine-like branches, commonly called "bird-vine" or "priest-vine," is a well-known, formidable nuisance on chocolate plantations.

Brazilian Mistletoe

This, like other tropical species, differs greatly from the familiar Christmas mistletoe. Exhibited in the Hall of Plant Life.

A few of the mistles do not share the perching habit of their kind but grow on the ground where, at least in their adult stage, they are independent. Some tropical American and Australian species grow as trees reaching thirty feet or more in height. One of these, flowering with a profusion of bloom at Christmas time, is used in Australia as a Christmas tree.

Museum Open 9 to 5 in April

From April 1 to 30 visiting hours at Field Museum will be from 9 A.M. to 5 P.M. instead of 4:30. From May 1 to September 2 (Labor Day) the hours will be 9 A.M. to 6 P.M.

Director's Report Goes to Press

The 1934 Annual Report of the Director of Field Museum to the Board of Trustees is now in process of printing by Field Museum Press. Distribution of copies to Members of the Museum may be expected to begin at an early date. The detailed review of the activities of the Museum for the year, by Director Stephen C. Simms, makes a book of 144 pages. It is illustrated with twelve photogravure plates.

ANIMALS FROM BARBADOS

Stewart J. Walpole, of Park Ridge, Illinois, has presented to Field Museum some interesting specimens of bats, frogs, and lizards which he collected during a recent visit to the island of Barbados, West Indies.

Of ten bats, one represents a species very rare in collections, and confined in distribution to this island. Another bat is related to a widespread West Indian form never before found on Barbados. Mr. Walpole reports that these bats do considerable damage to small orchards.

One of the lizards represents another animal new to the fauna of Barbados. It is remarkable to find in this collection two animals new to the island, as the fauna of Barbados is fairly well known. —C.C.S.

ANCIENT PERUVIAN "MUMMIES" AND GRAVES SHOWN

An exhibit of so-called "mummies," and reproductions of two opened graves of ancient Peru, was recently completed in the hall of South American archaeology (Hall 9). The mummies, which differ greatly from those of Egypt, are more accurately described as desiccated bodies. These were packed in bundles which were found buried at a depth of several feet in the famous necropolis or burying ground of Ancon, Peru.

Two of the mummy packs have been opened, revealing the bodies inside. They are in a good state of preservation, which is attributed by J. Eric Thompson, former Assistant Curator of Central and South American Archaeology, to the extreme aridity of the coastal plains of Peru where they were buried. The majority of Peruvian mummies were not artificially preserved, but in some cases the bodies were eviscerated, while in others resin was applied as a preservative. On the forehead of one of those in the exhibit traces of red paint or powder can be seen.

The graves which have been reproduced in the Museum date to the period about A.D. 1250. One contains three mummy bundles, apparently two women and a small child. The sex of the two adults is indicated by women's work baskets which were buried with them, and which appear among the contents of the grave as now exhibited. Bags of coca leaves, which the ancient Peruvians chewed as a stimulant, silver ornaments, spindles, and other objects are also included in the grave.

The second grave was covered by a roof two feet below the surface of the ground. This roof, now shown in the exhibit, was elaborately constructed, and is among the best preserved ones found at Ancon. It consists of three inches of hard white clay, beneath which are a layer of plant leaves, two mats of reeds, and rafters of algarroba wood. The grave contains a large mummy wrapped in fine garments, with a false head. Sacks, painted tablets, and clay and gourd vessels are arranged around the body in the positions in which they were found when the grave was opened. Most of the bodies in Ancon graves are buried in a flexed position so that the knees almost touch the chin. Mummy-packs with false heads usually contained the remains of persons who were regarded as important during life.

Skeletons of the extinct European cave bear and the sabertooth tiger, two of the most formidable natural enemies of primitive man, are on exhibition in Ernest R. Graham Hall (Hall 38).

FOUR MORE TRAVEL LECTURES ON APRIL SCHEDULE

The final four illustrated lectures in the spring course for adults will be given on Saturday afternoons during April. These travel lectures are accompanied by motion pictures and stereopticon slides. They are presented in the James Simpson Theatre of the Museum, and all begin at 3 P.M. Following are the subjects, speakers and dates:

April 6—Timbuktu and Beyond
Rudyerd Boulton, Assistant Curator of Birds, Field Museum; Leader of Straus-Field Museum West African Expedition

April 13—The West Indies
Major James C. Sawders, Nutley, New Jersey

April 20—The Canadian Rockies in Pictures and Story
Dan McCowan, Banff, Canada

April 27—The Buried Cities of Ceylon
Dr. Robert McMurry, New York City

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats on request. Requests for these seats may be made by telephone or in writing to the Museum, in advance of the lecture, and seats will then be held in the Member's name until 3 o'clock on the day of the lecture. Members may obtain seats in the reserved section also by presentation of their *membership cards* to the Theatre attendant before 3 o'clock on the lecture day, even though no advance reservation has been made. All reserved seats not claimed by 3 o'clock will be opened to the general public.

RAYMOND FOUNDATION PROGRAMS FOR CHILDREN CONTINUE

Continuing the spring series of free motion picture programs for children, the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures will show films each Saturday morning during April. Each program is given twice—at 10 A.M., and again at 11. All will be presented in the James Simpson Theatre of the Museum. Children from all parts of Chicago and suburbs are invited. They may come alone, in groups from schools and other centers, or with parents, teachers, or other adults. Following is the schedule showing the titles of the films to be shown on each date:

April 6—Beetle Friends and Enemies; Trained Bird Fishermen; Glimpses of Quaint Gaspé

April 13—Monkey Capers; Jungle Vaudeville; Souvenirs of Singapore; The Wapiti of Jackson Hole

April 20—Mushrooms and Their Cousins; Peter Stuyvesant

April 27—Nature's Weavers; Life of a Moth; Mounting Butterflies; Algonquin Adventures

Teeth of Mammals

Teeth of mammals vary greatly in structure among different species, genera and families but their structure is quite constant among individuals of the same species. They are, therefore, relied upon in classifying mammals.

A tooth of a fossil elephant from Texas, exhibited in Ernest R. Graham Hall (Hall 38), measures 8 x 13 inches and weighs seven pounds.

The elephant has but one molar tooth in each side of the jaw but this tooth is replaced six times during the life of the animal.

CHINESE FIGURE PRESENTED AS LAUFER MEMORIAL

An ancient Chinese clay figure of a dancing woman, dating from the T'ang period, between A.D. 618 and 906, has been presented to Field Museum by a friend of the institution who wishes to remain anonymous. The figure, of rare beauty and unusual archaeological interest, comes from a Chinese grave. It is now on exhibition in Stanley Field Hall. In accordance with the donor's

Chinese Mortuary Figure
A notable clay statuette, presented to the Museum by an anonymous donor, as a memorial to the late Dr. Berthold Laufer.

wishes, it is to be kept as a permanent memorial to the late Dr. Berthold Laufer, for many years the Museum's Curator of Anthropology, and one of the world's foremost scholars in Oriental subjects.

Made of a durable clay, artistically molded, and painted in delicate soft colors, the statuette is remarkably well preserved. It is of exceptionally high value. While the Museum has a collection of other figures of the same type, this one is especially notable.

Mortuary clay figures of this kind were buried with the dead in China as manifestations of the joy of living. Life was regarded as endless, with death a mere transformation whereby existence continued in another form. The figures buried in graves were made to represent persons and objects most dearly regarded in life by the deceased.

An original Sun Dance altar of the Arapaho Indians is to be seen among the anthropological exhibits in Mary D. Sturges Hall (Hall 5).

APRIL GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for April:

Week beginning April 1: Monday—Horses and Their Relatives; Tuesday—Life in the Far North; Wednesday—Primitive African Life; Thursday—General Tour; Friday—Interesting Foreign Birds.

Week beginning April 8: Monday—Indians of the Southwest; Tuesday—Amphibians and Reptiles; Wednesday—Looms and Textiles; Thursday—General Tour; Friday—Hall of Plant Life.

Week beginning April 15: Monday—The Gem Room; Tuesday—Habitat Groups; Wednesday—Races of Mankind; Thursday—General Tour; Friday—Etruscan and Roman Exhibits.

Week beginning April 22: Monday—Fishes, Past and Present; Tuesday—Prehistoric Life; Wednesday—Mexico; Thursday—General Tour; Friday—The Art of the Cave Dwellers.

Monday, April 29—Minerals and Ores; Tuesday—Animal Life of the Chicago Area.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in FIELD MUSEUM NEWS. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Miss Alice B. Robbins—lady's coat of Ta Kang period of Ching dynasty, China; from anonymous donor—a rare, important, hand-decorated mortuary figure of dancing woman, T'ang dynasty (618-907), China; from Dr. Román S. Flores—a photograph and 3 herbarium and wood specimens, Yucatan; from Dr. Martin Cárdenas—300 herbarium specimens, Bolivia; from Stafford C. Edwards—3 concretions, California; from Charles A. Ordway—2 iron ore specimens, Idaho; from Museum of Comparative Zoology—310 bats, Canal Zone; from Leslie Wheeler—2 Brewster's screech owls and 18 skins of hawks and owls, mostly Costa Rica and Oregon; from Stewart Walpole—37 bats, toads, frogs, and lizards, West Indies; from Chicago Zoological Society—7 lizards, 6 snakes, and a fruit bat; from Donald B. Hodgson—2 bird skins, Guatemala; from Edward Schaack—a snake, British Honduras; from Gordon Grant—102 land shells, California; from E. M. Miller—a frog, Florida; from H. B. Conover—a bird skin, Korea; from Phil C. Orr—2 fence lizards, Kentucky.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from February 16 to March 15:

Associate Members

Edward M. Kerwin, Mrs. Roscoe G. Leland, Louis Ralph McCreight, Thomas C. Orr, Miss Luella Raithel, T. J. Reed, Charles W. Spooner, Miss Myrtle I. Starbird.

Annual Members

Miss Aurelia Bertol, Richard S. Bull, Mrs. Dale E. Chamberlin, Mrs. Philip R. Clarke, Dr. A. A. Dahlberg, Norman Daniel, Mitchel Goldsmith, Herbert Graffis, Thomas H. Heneage, Miss Augusta La Camp, Charles B. Obermeyer, Mrs. Bartholomew O'Toole, Clarence B. Randall, Mrs. Egbert H. Spencer, Mrs. J. Elmer Thomas, Charles H. True, Peter Leland Wentz, John Wickstrom, Clyde O. Williams, Kenneth Williams, Attilio Zambon.

SPECIAL NOTICE

Members of the Museum who have changed residences or plan to do so are urged to notify the Museum of their new addresses, so that FIELD MUSEUM NEWS and other communications may reach them promptly.

Members going away during the summer, who desire Museum matter sent to their temporary addresses, may have this service by notifying the Museum.

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ELEPHANT SEALS, COLLECTED BY HANCOCK EXPEDITION, IN HABITAT GROUP

By Wilfred H. Osgood
Curator, Department of Zoology

The production of a group of elephant seals is quite a large undertaking, because this animal is rare, limited in distribution, troublesome to preserve and transport, and difficult to prepare for exhibition. Fortunately for Field Museum, the greatest of these difficulties were overcome when Captain G. Allan Hancock, of Los Angeles, offered his personal cooperation and the facilities of his ship, the *Velero III*, a large motor cruising vessel which often is enlisted in the cause of science and education. At the same time, Dr. Harry M. Wegeforth, President of the San Diego Zoological Society, negotiated with the Mexican government for the necessary permission to take the specimens on Guadalupe Island. Part of the expense of the expedition was met with income from the Emily Crane Chadbourne Fund.

On May 28, 1933, with Captain Hancock and Dr. Wegeforth on board, as well as two Field Museum taxidermists, Messrs. Julius Friesser and Frank Wonder, the *Velero* sailed from San Diego for Guadalupe and other islands in Mexican waters off the coast of Lower California. The expedition, as reported in Field Museum News (July and August, 1933), was entirely successful, and after some two weeks of intensive work, the skins of five selected animals were safely preserved and on the way to Chicago. Now the projected group has been completed in the Museum's Hall of Marine Mammals (Hall N).

Since the animal is a true seal quite unrelated to elephants, it should be called elephant seal rather than sea elephant, although both names are fairly appropriate. We have elephant shrews, elephant fishes, and even elephant beetles, but these small animals are so named only because of their elongated snouts. The elephant seal not only has a short proboscis or "trunk," but it is elephantine in size, and its grayish color and the texture of its thinly haired skin suggest the elephants.

There are two species of elephant seals, respectively called southern and northern. The southern species (*Mirounga leonina*) formerly was widely distributed on Antarctic islands and still appears in small numbers on a few of them. The northern species (*Mirounga angustirostris*) is similar in size and general characteristics to the southern one, but has the proboscis much more highly developed. At present the northern species is reduced to a single herd which resorts only to Guadalupe, an uninhabited island lying about 150 miles off the Mexican coast and some 300 miles southwest of San Diego. Originally, the animal was common all along the coast of Lower California and was recorded as far north as Point Reyes, California. This, however, was more than a hundred years ago. The crews of whaling and sealing vessels found it an easy prey and it was killed recklessly for its oil, one of the markets for which was provided by the forty-niners of the California gold rush. After the middle of the nineteenth century it became so scarce that experienced whalers reported it to be practically extinct.

In recent years the northern elephant seal has shown a remarkable and gratifying capacity to restore itself. In 1892 only eight animals were reported on Guadalupe Island; in 1907 about forty were seen; in 1911 as many as 125 were found; in 1923 a careful count showed 366; in 1928 a further increase was shown; and in 1933 the Hancock Expedition estimated a total of about 1,200, of which 400 were males. Thus, within a few decades, what was a mere remnant of a species, vulnerable to any whim of man or physical nature, has grown to such proportions that its continued existence is practically assured. A few years ago the government of Mexico proclaimed Guadalupe Island as a special reservation and a small military garrison was established there for the protection of the seals.

Comparatively few naturalists have had opportunity to study the elephant seal, and much remains to be learned of its habits. Even its size is debatable. Early accounts gave lengths of twenty-five and even thirty feet for large males, but actual measurements, so far as taken, do not corroborate such dimensions. The fine bull obtained by the Hancock Expedition was selected from a large number judged to be of about maximum size, but its overall length was found to be exactly sixteen feet eleven inches. Captain Scammon, a famous whaler with an unusual experience and reputation for accuracy of statement, gives twenty-two feet as the maximum. Dr. J. A. Allen records measurements of a skeleton of the southern species from which he estimated a length of "twenty-one to twenty-two feet" for the living animal. At least it can scarcely be disputed that the elephant seal is the largest of all seals, for the Pacific walrus, its

(*Continued on page 4*)

World's Largest Species of Seal Exhibited in Hall of Marine Mammals

Scene on Guadalupe Island, off the coast of Mexico, as reproduced at Field Museum with specimens of huge elephant seals collected by an expedition with Captain G. Allan Hancock aboard his ship *Velero III*. Group prepared by Staff Taxidermist Julius Friesser, assisted by Frank Wonder; background by Staff Artist Charles A. Corwin.

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

THE "DEVIL'S CORKSCREWS"

By Sharat K. Roy
Assistant Curator of Geology

Nature produced huge earthy corkscrews long before man existed and had any reason for making metal ones.

From northwestern Nebraska first word was brought by cowboys of the occurrence of these curious corkscrew-like forms that mark the bare bluffs, buttes and canyon walls of that region. Not knowing what they were, the cowboys called them by such expressive names as "stonescrews," "devil's corkscrews," "twisters," and "fossil worms."

These phenomena, which were a mystery to the cowboys some four decades ago, are still a puzzle to scientists who have made extensive studies of them. The origin of these bodies is not yet understood. Hypotheses representing them as plants, casts of animal burrows, and mineral accretions have been brought forward from time to time, but none have met critical analyses.

The corkscrews are found abundantly in the Lower Harrison Bed (Lower Miocene) of Sioux County, in northwestern Nebraska,

A Geological Mystery

Daemonelix or "devil's corkscrew." Science has been unable to determine satisfactorily the origin of these strange spiral earthy formations found abundantly in northwestern Nebraska.

and occasionally in beds of the same age in adjoining areas. In appearance they are simply huge earthy spirals with or without a transverse projection at the base which simulates half a handle, usually rises at an angle, and often is as long as the spiral itself. The corkscrews vary in form, size, and direction of twist, but are always found upright. The spirals are either dextral or sinistral, and they either coil about a central axis or stand without an axis. The pitch of the screw is exceedingly uniform as is also its diameter. The helix tapers from base to top with astonishing exactness, seldom varying more than a millimeter in each turn of 90 degrees.

The idea of a vegetable origin for the corkscrews arises chiefly from the fact that the transverse projecting base has the structure of a "rhizome," while the vertical open spiral is made up of interlacing fibers which, when examined in thin sections, show cell structures similar to those in the pith of plants. The objection to considering these bodies to be plants, however, lies in the fact that no known plants have such a manner of growth or are so uniform in diameter. The chlorophyll bands of spirogyra are spirally arranged, and so are the leaves of many plants, but that a whole plant should turn itself right or left in helix fashion has been hitherto practically unknown. It is, therefore, only natural that botanists should frown upon efforts of geologists to introduce an admittedly anomalous form, of questionable pedigree, into the presumably unadulterated society of plants.

Those who advocate that the corkscrews represent casts of burrows of some large rodents believe that the "rhizome" was the entrance, and the spiral vertical portions were contraptions for ventilation as well as for escape of the excavators. Some rodents do make spiral burrows, and, in fact, skeletons of a large beaver-like rodent and of a carnivore have been found at the ends of corkscrews. Yet it does not seem reasonable that a rodent could have been so accurate a geometer as to construct a burrow so uniform in pitch and size. Further, it would seem to have been a physical impossibility for him to construct the spirals which have an axis, for this would necessitate digging a straight hole through a spiral one without support for either. Recently, two specimens, somewhat resembling the Nebraska corkscrews, have been discovered in the Pleistocene of Rock Creek, Briscoe County, Texas. Their discoverers ascribed them to a burrow origin, but the data offered are insufficient to substantiate this view.

The suggestion that the corkscrews are of purely mineral origin, representing accretions of mineral matter, has also a few adherents. True, many forms of mineral origin take remarkable imitative shapes, but when one considers the great uniformity in shape and large number of corkscrews, such an explanation does not seem convincing. The question of the nature and origin of the corkscrews is, therefore, still an open one. It is possible that they are concretions, produced by colloidal precipitation.

Field Museum has four specimens of these corkscrews on exhibition in Ernest R. Graham Hall (Hall 38). They represent all the important forms known. They range from two to seven feet in height, and are about four inches in diameter. All were collected in 1899 by a museum expedition under the leadership of Mr. Elmer S. Riggs, Associate Curator of Paleontology.

NOTABLE REPTILE COLLECTION

Mr. Stewart Springer of the Caribbean Biological Laboratories, Biloxi, Mississippi, has presented to Field Museum a part of the accumulated study specimens preserved at Biloxi. These include one hundred and ten specimens of salamanders, of forty-two species; ninety-six frogs, of forty species; one alligator; eleven specimens of turtles, each of a different species; seventy lizards, of forty species; and eighty-one snakes, of sixty-one species.

Several species are new to Field Museum's collections, and numerous others represent rare or little-known forms. It is especially gratifying to obtain a series of salamanders and frogs from Europe, for the European fauna is often less well represented in American museums than that of many remote and inaccessible parts of the world. In the American material, the series of well-preserved specimens from Mississippi is notable. The specimens in the Museum's study collections of reptiles, preserved in alcohol and used for reference in connection with varied scientific research, now number about 30,000. —K.P.S.

The archaeology of Colombia is well represented by fine collections of ancient work in gold, pottery, shell and stone in the Department of Anthropology.

Tracks of prehistoric reptiles found in Massachusetts are preserved in an exhibit in Ernest R. Graham Hall (Hall 38).

EXHIBIT OF EXTINCT NORTH AMERICAN BIRDS POINTS LESSON ON CONSERVATION NEED

By Rudyerd Boulton
Assistant Curator of Birds

The animal population of the world normally undergoes a slow and gradual change. Species that are unadaptable to changed conditions die off and other more plastic forms evolve to fill the environmental niche that they have vacated. With the dominance of the Mechanical Age on the earth, man has become a potent factor in the extinction of certain wild animals.

Exterminated In 1932

The heath hen, one of the first birds known to the American colonists. Its recent extinction is an example of the need of active conservation measures.

An exhibit of extinct North American birds, recently installed in Hall 21, graphically demonstrates this tendency. Eight of the twelve species of birds known to have become extinct in historic times are shown. The great auk, which is represented in the exhibit by a replica (of which a photograph appeared in the December, 1934, issue of Field Museum News), disappeared in 1844 as a result of persecution by fishermen. They used the eggs for food, boiled the bodies for their oil, and used the flesh for codfish bait. The great auk was flightless and was perfectly adapted to a very specialized routine of life. It avoided potential natural enemies by the simple device of nesting only on isolated rocky islands. It was not adapted to resist continued persecution by man.

The Labrador duck is represented by a splendid male formerly in the collection of the late Mr. Charles B. Cory, once Curator of Birds at Field Museum. This species became extinct in 1878 for reasons that have never definitely been determined. From the form of its bill, it obviously had very specialized feeding habits. It had a restricted winter range along the New England coast, and was undoubtedly one of the first species to suffer from excessive hunting.

The other ten extinct species, of which six are shown in the exhibit, existed until the turn of the twentieth century. The Carolina paroquet was last seen in Florida in 1904. It disappeared due to an excessive demand for caged birds.

The heath hen, for more than a century limited to a small colony on the island of Martha's Vineyard, formerly ranged over most of the northern Atlantic coastal plain. It became extinct in 1932. It is interesting to note that, one year after the close of the American Revolution, a law was passed on Long Island protecting the heath hen during its nesting season. After several years of effort, the protective committee was dissolved because the law was flagrantly disregarded. The difficulty of enforcing game laws was discouraging 150 years ago even as it is now.

The passenger pigeon, last seen in 1907, the Guadalupe flicker and the Guadalupe petrel, which disappeared in 1906, and the Eskimo curlew, exterminated in 1925, are the other four unfortunate birds which complete the exhibit. Their extinction affords examples which, if sufficient heed be taken, may have the effect of saving others whose existence is threatened.

The remaining four extinct birds of North America, not shown in the exhibit, are the Guadalupe caracara, the Guadalupe wren, the Bermuda petrel and the Louisiana paroquet. The exhibit was installed by Staff Taxidermist Ashley Hine, to whose talent was entrusted the difficult task of preparing these old and priceless specimens.

Wiped Out by Pet Market

The Carolina paroquet. This bird, and its close relative, the Louisiana paroquet, were the only parrots native to the United States. Demand for caged birds brought their extinction by 1904.

SOUTH AMERICA ANTHROPOLOGY EXHIBITS COMPLETED

Reinstallation of the exhibits in Hall 9, the hall of South American archaeology and ethnology, was recently completed. Much new material has been added to this hall illustrating the lives of the principal Indian tribes of South America, both those of the past and those of the present time.

Among the important collections representing present-day tribes are those from the Chaco Indians and the Jivaro, the latter of whom inhabit the forests of eastern Ecuador and are noted for their practice of shrinking the heads of their enemies. Several such shrunken human heads are exhibited. There is also a large exhibit pertaining to the culture of the tribes of the northwest Amazon, Orinoco Basin, and Guiana regions. Of special interest are exhibits showing the preparation of food from the poisonous mandioca tuber, and the sacred trumpets used in initiation rites.

The archaeological exhibits demonstrate the high culture of the inhabitants of the west coast of South America before Columbus reached this hemisphere. The civilization of the aboriginals of Colombia is well illustrated by collections of gold, pottery, shell and stone work. There are several cases of artistic pottery dating from pre-Inca times, dug up in the Chimu district on the Peruvian coast. Noteworthy are a number of so-called "mummies" or desiccated bodies and reproductions of graves in which they were found. Another section of the hall is devoted to the little-known Diaguite culture which flourished in early times in northwestern Argentina, and the adjacent cultures of pre-Hispanic Chile.

SKULLS OF RARE BATS ARE FOUND IN ETHNOLOGICAL COLLECTIONS

By Colin C. Sanborn
Assistant Curator of Mammals

It is a custom of many tribes in various parts of the world to save the skulls of animals which they kill for food. These are usually hung to the ceilings of their houses where they become blackened by the smoke of the cooking fires. The smaller skulls are fastened in rows on short sticks. The skulls are saved, not only to show the ability of the hunter, but because it is believed that they will aid him in killing more of the animals.

Three such sticks holding bats' skulls were collected in Luzon in 1909 by Director Stephen C. Simms (then Assistant Curator of Ethnology), while he was leader of the Robert F. Cummings Expedition to the Philippines. A recent examination of these skulls by the Division of Mammals shows that five kinds of bats are represented, including six specimens of the very rare Jagor's Bat (*Ptenochirus jagori* Peters). This bat was discovered in 1861 in south Luzon by Mr. F. Jagor. It has since been found in other islands of the Philippines but never in any numbers and has always been rare in collections, especially in this country.

The skull of another rare bat was found decorating the head of a lime spatula collected in 1908 in New Guinea by the late Dr. George A. Dorsey, then Curator of Anthropology. This skull represents a bat known from one specimen collected on the Cornelius Crane Pacific Expedition, which became the type of a new species (*Pteropus sepikensis* Sanborn). It is a very large fruit eating bat, often called flying fox, with a wing spread of more than five feet.

These skulls have been transferred from the Department of Anthropology to the Department of Zoology.

TEAPOTS THAT FUNCTION LIKE THERMOS BOTTLES

Some examples of the Chinese equivalent of thermos bottles are included in an exhibit recently added to Hall 32 (West Gallery). These consist of wickerware baskets with heavily padded interiors, fitted with porcelain teapots. It is said that they are as efficient in keeping tea or other liquids hot as the vacuum bottles used in this country. The spout of the teapot projects through a perforation in the lock of the basket, making it possible to pour without removing the pot. The baskets are fastened with a brass hook in the form of a fish, the tail of which fits into a loop. Although the thermos bottle was invented in England, as recently as 1907, the Chinese have had their hot teapots for the use of travelers for hundreds of years.

NATIVE CHICAGO PLANTS CAN GLORIFY GARDENS

By Paul C. Standley
Associate Curator of the Herbarium

Everywhere there is an illogical disposition to scorn native plants for cultivation in gardens, even when the same plants are highly esteemed in regions where they are not native. Although their beauty is not generally questioned, they are held unworthy of garden planting apparently because they can be procured at no cost. The fact that these plants are, naturally, best adapted to cultivation in the regions in which they are native, usually requiring less care in cultivation than exotic species, is ignored.

With the wild flowers obtainable around Chicago it is possible to make a most attractive garden, that will afford an abundant display of beautiful flowers, fruits, or foliage throughout the growing season, or even well into the winter. Such a garden, composed of plants obtained leisurely at separated places, may furnish too a living record of many pleasant tramps or drives through the countryside. Since many of the most ornamental plants are of abundant occurrence, no harm is done by transplanting a few, and the rarer sorts usually may be obtained from nurserymen who make a specialty of propagating them.

What trees could be handsomer than the fragrant crab apple, the snowy hawthorn that later is covered with red fruit, or the flowering dogwood? Among shrubs there are the spice bush, pawpaw, witch hazel with its strange habit of flowering in late autumn, wild plum, sand cherry, shad bush, wild roses, ninebark (*Physocarpus*), the white and pink spiraeas, hop tree (*Ptelea*), sumacs so gorgeous in autumn foliage, winterberry (*Ilex*) loaded with its red fruits, New Jersey tea, the small-flowered dogwoods, one of which has red branches that contrast beautifully against a background of snow, trailing arbutus if it can be induced to grow, button bush, elderberry, and a good many more.

Even of ornamental vines there is an ample variety. They include the wild yam (*Dioscorea*), carrion flower (*Smilax*) with its handsome fruit clusters in autumn, moonseed with black berries, white clematis, bittersweet, Virginia creeper, and wild cucumber.

The herbaceous plants afford sufficient variety to please every taste. It is possible to obtain even in the city something of the breath of spring by planting Jack-in-the-pulpit, wild hyacinth (*Camassia*), trilliums, hepatica which probably will be the first of all to open its flowers, wild ginger, bloodroot, Dutchman's breeches, violets, shooting star, phlox, and puccoon. For late spring and summer there are spiderwort, our wild lilies that are fully equal to many of the Oriental ones, iris, lady's-slippers to represent the orchid family, red columbine, baneberry with white berries that seem to be made of china, may-apple, lupine, wild geranium, flowering spurge, rose mallow, prickly pear, evening primroses, cow parsnip, and the handsome milkweeds in their great variety including butterfly weed, horse mint, dragon head (*Physostegia*), pentstemons, Culver's root, bluebells, cardinal flower and blue lobelia, Joe Pye weed, blazing stars, coreopsis, yellow groundsel, the perennial sunflowers, and ever so many more. An autumn garden may be made bright with blue and white gentians, the innumerable asters whose beauty seems to have attracted little attention in America, although it is fully appreciated in Europe, and, if you like them, the goldenrods.

Most of the plants listed are easy to cultivate, and the majority are easily procured. The lists could be extended greatly to include other plants well worthy of a place in gardens, and one who has once begun the formation of such a garden will always find desirable new plants to add to it.

Many of the attractive plants mentioned here, as well as others native in the Chicago region, are illustrated by lifelike and accurate reproductions in the Hall of Plant Life (Hall 29) in Field Museum.

ELEPHANT SEALS

(*Continued from page 1*)

only possible rival, reaches a length of no more than thirteen or fourteen feet.

Weights are more problematical than dimensions and have in all cases been estimated. The bull taken for the Museum's group was thought to weigh about 5,000 pounds and it has often been stated that the weight of large bulls should reach at least 6,000 pounds. The fresh skin of the Museum's bull, which was subject to fairly accurate estimate, was believed to weigh alone about 1,000 pounds. It was removed on the beach, and was so large and heavy it could not be transported to the anchored yacht by any of the ship's boats, so it became necessary to build a raft on which it was towed to the vessel's side and hauled on deck with the winch.

Elephant seals, when out of the water, show little fear of man, presumably because they have few natural enemies, but perhaps also because their movements on land are slow and laborious. They progress over the sand beaches by arching the back and drawing the hind-quarters forward after the fashion of the caterpillars called inch-worms. Their food doubtless includes considerable fish, but the principal remains found in their stomachs are those of squid. The proboscis, found only in the males, reaches a length of about ten inches and, contrary to general belief, is not demonstrably inflatable. Its structure is fibrous and fleshy and its control apparently is muscular.

The Museum's group was prepared by Staff Taxidermist Friesser and Assistant Wonder, who collected the specimens. The background, painted by Staff Artist Charles A. Corwin, shows a section of "Elephant Beach," the principal hauling ground of the animals on Guadalupe Island.

Summer Visiting Hours Begin

Beginning May 1 summer visiting hours, 9 A.M. to 6 P.M., go into effect. The Museum will be open during these hours up to and including September 2 (Labor Day).

"Naturalized Bird Citizens" of U. S.

A case of foreign birds that have been introduced and naturalized in America has recently been installed in Hall 21. This, together with the exhibit of extinct North American birds described elsewhere in this issue of Field Museum News, illustrates the changes which are gradually affecting the natural fauna of America.

A miniature model of an ancient Maya pyramid is exhibited in Hall 8.

The William J. Chalmers crystal collection on exhibition in Hall 34 contains many rare specimens from all parts of the world.

MAY GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for May:

Wednesday, May 1—Primitive Armor and Weapons; Thursday—General Tour; Friday—Plants and Animals of the Past.

Week beginning May 6: Monday—Egyptian Hall; Tuesday—Birds and Their Skeletons; Wednesday—Man Through the Ages; Thursday—General Tour; Friday—Plants and Their Uses.

Week beginning May 13: Monday—Chinese Exhibits; Tuesday—Indians of Plain and Plateau; Wednesday—Jewelry of Many Lands; Thursday—General Tour; Friday—Monkeys and Their Relatives.

Week beginning May 20: Monday—Geology Halls; Tuesday—Palms and Cereals; Wednesday—South American Exhibits; Thursday—General Tour; Friday—Strange Animals.

Week beginning May 27: Monday—Types of Mankind; Tuesday—Botany Halls; Wednesday—Musical Instruments; Thursday—Memorial Day holiday, *no tour;* Friday— Animal Ecology.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in Field Museum News. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Eastman-Gardiner Hardwood Company—2 sycamore boards, Mississippi Valley; from Carl Buhl, Jr.—personal herbarium of 887 specimens, most of them mounted, chiefly Illinois and Indiana; from Dr. Lorenzo R. Parodi—19 herbarium specimens, Argentina; from Yusuf Lazar—476 herbarium specimens, Iraq; from Rustam Experimental Farm—15 herbarium specimens, Iraq; from Professor Ernst Herzfeld—85 herbarium specimens, 5 acorpions, and a solpugid, Iran; from Standard Oil Company of New Jersey—3 specimens vertebrate fossils, Argentina; from A. F. Sitterle—a double concretion, Texas; from Leslie Wheeler—17 owls, 29 hawks, and 2 goat-suckers; from Dr. Walter P. Kennedy—14 insects, Iraq; from Stewart Springer—369 specimens of salamanders, frogs, turtles, lizards, snakes, and an alligator; from Dr. F. R. Shaw—31 insects and 4 solpugids, Palestine and Transjordania; from A. R. M. Rickards—a solpugid, Iraq; from E. Bonati—3 acorpions and 3 solpugids, Iran; from Henry Dybas—3 common and 2 plains gartersnakes, Illinois; from Dr. A. I. Ortenburger—a keeled musk turtle, Oklahoma; from John P. Kellogg—3 salamanders, Virginia; from Edward J. Brundage, Jr.—30 insects, Connecticut; from Bernard Benesh—36 beetles, United States.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from March 16 to April 15:

Associate Membera

Edison Dick, Mrs. Edmund J. Doering, Jr., Mrs. E. E. Fies, Mrs. Joseph B. Fleming, Miss Susan E. Jones, Miss Zipporah Herrick Pottenger.

Annual Members

Rev. Edward S. Ames, Peter Bartoli, Herbert J. Bird, Henry S. Blum, Fred B. Borneman, Guy Brown, Andrew K. Bushman, James A. Cathcart, Miss Ellen M. Cauvina, Dr. Beulah Cushman, Carl Dreutzer, Mrs. L. S. Hungerford, Miss Gwendolyn Lucille Kolar, Mrs. Samuel N. Leitzell, John Henry Liebenthal, Arthur F. Lindley, Richard Mayer, William C. Napier, F. B. Steece, E. C. Trowbridge.

Knight Book Proves Popular

Before the Dawn of History, the book by Mr. Charles R. Knight, illustrated with his paintings and drawings of prehistoric life including many of those on exhibition in Ernest R. Graham Hall at Field Museum, has proved so popular that three printings were necessary in the first four weeks after publication, it is reported by the publishers, Whittlesey House (McGraw-Hill).

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DRAMATIC EXHIBIT OF LEOPARD, IN WILD FIG TREE, CROUCHED FOR ATTACK

By Wilfred H. Osgood
Curator, Department of Zoology

The common leopard might well appear either in an exhibit of African or of Asiatic animals. Circumstances have favored its having a position among the Asiatic groups in William V. Kelley Hall (Hall 17) and it has now taken this place in the quartet of groups of carnivorous mammals which face the center of the hall. Although only one animal is shown, it is so effectively combined with a forest scene that the character and habits of the species are forcefully and successfully indicated by subtle suggestion as well as by direct portrayal.

Aside from the lion and tiger, the larger cats of the world are few in number. The leopard, the jaguar, the cougar or American mountain lion, the cheetah, and the snow leopard make up the list. Of these, the leopard is the most numerous and widely distributed and, on the whole, it is perhaps the best general representative of the whole cat family, best in this case meaning the best average. In other words, the leopard is the best all-around cat, neither too large nor too small, neither confined to the ground nor to the trees, and able to live and thrive under various climatic conditions. For its rapacious life of violent slaying and devouring it is well equipped and successful.

The geographical range of the leopard is very extensive, including practically all of Africa except the central Sahara, and most of Asia except the extreme north and the Tibetan highlands. In the East Indies it extends to the islands of Java, Sumatra, and Borneo. Within this wide area it is subject to numerous minor variations, but its general character remains the same and, like the wide-ranging American cougar, it is probably best regarded as a single species with numerous geographical races.

The leopard's beautifully spotted coat is similar to that of its American cousin, the jaguar, but the spots are more regular and when they take the form of rosettes these do not inclose a central black spot. The leopard has longer legs than the jaguar and, being more lightly built, is probably a better runner. The so-called black leopard or "panther" is not a distinct species but a black phase due to melanism. Such black animals are often born to spotted parents. They are fairly common in southern Asia but occur very rarely, if at all, in Africa. Usually they are not fully black and the spotted pattern is discernible in certain lights.

The leopard's hunting is done mostly at night, but in regions where it is numerous, hunters occasionally have chance encounters with it by day. If wounded or suddenly brought to bay, it attacks man fiercely and, in some instances, it has been known to develop the man-eating habit. Normally, it preys upon a wide variety of animals, antelopes, deer, sheep, goats, monkeys, birds, and at times even reptiles. As one author has expressed it, the leopard "can strike down an ox, or pounce upon a sparrow." Owing to its secretive and mostly nocturnal habits, the leopard is not often the special objective of sportsmen. Experienced hunters, however, have much respect for it and there are not a few who would vote it the most dangerous animal to be found in the jungle. Presenting a relatively small mark and moving with incredible speed and agility, it is more likely to succeed in carrying through its charge than is the king of beasts himself.

In the experience of Field Museum expeditions, the leopard has more often threatened fatalities than any other animal. During the Museum's first African expedition Carl Akeley had a thrilling experience in which he was charged by a wounded leopard and forced to hand to hand struggle which lasted until the leopard was strangled and the hunter's arm, which had been thrust down its throat, was frightfully mangled. On a later Museum expedition, also in Africa, Edmund Heller awoke one night to find a leopard in his tent seizing a pet monkey that was sleeping there with him. Again, on the Conover–Everard Expedition, a leopard was caught in a trap by John Zimmer and it broke the chain or fastening and moved into tall grass with the trap attached to its foot. On being followed by the hunters and a number of natives, it made several charges before it was finally killed, and at one time it was practically standing over a native who had fallen in the grass. A similar incident with a trapped leopard occurred on the *Chicago Daily News* Abyssinian Expedition and, in this case, a native received a severe scalp wound. The unarmed native had followed the animal a short distance, meanwhile calling to Alfred Bailey to come with his rifle. Just as Bailey arrived, the leopard charged and it was killed practically in mid-air, going down with its claws sunk in the rash boy's scalp.

Leopard Ready to Pounce on Victim

New group recently completed in William V. Kelley Hall. The animal was obtained by the late Colonel J. C. Faunthorpe. The group was prepared by Staff Taxidermist Leon L. Pray, assisted by Frank Letl.

The specimen used in the Museum's exhibit was obtained in central India by Colonel J. C. Faunthorpe. It is shown in the branches of a wild fig tree, reproduced from studies made by cooperation with the Bombay Natural History Society. Taxidermy, background, and accessories are by Taxidermist Leon L. Pray assisted by Frank Letl.

BREAD FRUIT

Bread fruit, with which most people have made their first acquaintance as youngsters in reading *Robinson Crusoe*, is the subject of an exhibit in the Hall of Plant Life (Hall 29). The exhibit contains a leafing, flowering and fruiting branch of this Polynesian tree which supplied a staple item in the diet of Defoe's hero on his desert island.

The exhibit includes also a cut section of bread fruit, showing the edible pulp; some resinous gum obtained from the bread fruit tree, and used by natives of the islands where it grows to caulk their canoes; and specimens of the related jack fruit.

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

FIELD MUSEUM NEWS

Stephen C. Simms, *Director of the Museum*.....*Editor*

CONTRIBUTING EDITORS

Paul S. Martin.....*Acting Curator of Anthropology*
B. E. Dahlgren.....*Curator of Botany*
Henry W. Nichols.....*Curator of Geology*
Wilfred H. Osgood.....*Curator of Zoology*
H. B. Harte.....*Managing Editor*

Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

THE CAP-BLANC SKELETON IS SUBJECT OF BOOK

A monograph on the Magdalenian skeleton from Cap-Blanc, which is exhibited in the Hall of the Stone Age of the Old World (Hall C) at Field Museum, was recently published by the University of Illinois, under the auspices of its Graduate School. Dr. Gerhardt von Bonin, of the staff of the department of anatomy at the university, is the author. He made a profound study of this specimen, which is the only Paleolithic human skeleton in any American institution.

The skeleton is that of a girl, estimated to have been about twenty years of age at the time of her death. It was found in the Cap-Blanc rock-shelter in the Dordogne region of France, on the walls of which is one of the most important examples of sculpture of the Magdalenian period—a famous frieze of horses. This rock-shelter has been reproduced in one of the series of dioramas in the Hall of the Stone Age, adjacent to the case containing the original skeleton.

Dr. von Bonin's monograph discusses all features of the skeleton in detail, as observed in his careful studies. The monograph is illustrated with nine large plates of photographs and diagrams. It is dedicated to the memory of the late Dr. Berthold Laufer, former Curator of Anthropology at Field Museum. Copies of the book are on sale at Field Museum. Price $1.00. Postage additional on mail orders (7 cents in Chicago).

AIR CUSHION PROTECTS EARTH FROM MOST METEORITES

By Henry W. Nichols
Curator, Department of Geology

Meteorites, so many of which are shown in Hall 34, would be dangerous visitors were it not for the protection afforded the surface of the earth and its inhabitants by the atmosphere. So numerous are the meteorites that enter the upper atmosphere and so great is their velocity that if they reached the surface of the earth unimpeded, the constant bombardment would make human life perilous if not impossible. Fortunately the air interposes an obstacle or cushion through which few of them can pass and those few only with greatly reduced speed and much diminished size.

It is impossible to estimate with any pretense to accuracy the number of meteorites that enter the air, but this number is known to be very large. Some estimates, based upon such imperfect data as can be obtained, are as high as nearly a million an hour. Fortunately, most of these meteorites are very small, comparable with grains of sand in size. It is believed that most meteorites enter the air at speeds between eight and forty-four miles per second. At such enormous speeds even particles as small as grains of sand become deadly projectiles.

A meteorite that weighs only one pound, moving at a speed of forty-four miles per second, would strike with a force of more than eight hundred million foot-pounds. The smashing power of a meteorite of even moderately large size would be much greater. Even the extremely rarefied upper air opposes a strong resistance to bodies moving at such enormous speeds. The friction of passage rapidly reduces the velocities to moderate values comparable with those of ordinary falling bodies. Sufficient heat is generated by this friction to heat the surface of the meteorite to incandescence. The surface melts and a film of molten matter covers it. This molten film is rapidly blown away by the powerful air currents generated by the passage and trails behind forming the luminous train seen behind meteors and shooting stars. The melted surface film is renewed as fast as it is blown away and thus the substance of the meteorite is consumed. Nearly all meteorites that enter the air are completely destroyed in this way. Very few survive to strike the ground. An iron meteorite would have to weigh from ten to twenty pounds for even a small core to persist until it reached the solid earth and few of the many meteorites that enter the upper air are as large as this. The meteorites that have fallen are but the remnants of much larger bodies.

The height at which the initial velocity of nine meteorites was overcome and from which they fell under the influence of gravity alone has been computed and found to be from about two and one-quarter to twenty-nine miles. Even the fall by the pull of gravity is retarded by the resistance of the air which checks the fall greatly but in varying degrees dependent on the weight, size and shape of the meteorite. The few giant meteorites weighing thousands of tons each which made great craters (as described in the February, 1934, issue of Field Museum News) are exceptional. Their enormous weights were sufficient to overcome in great degree the retarding effect of the atmosphere.

CHINESE HOUSEHOLD EXHIBIT

An exhibit of Chinese household objects, together with a few Chinese scientific instruments, was recently added to the hall of Chinese ethnology (Hall 32).

Included are elaborate vanity boxes used by Chinese women, decorative hair combs, pillows made of various materials such as pottery, rattan, or leather on a wooden frame, hand warmers, incense boxes, padlocks, combination locks, bed curtain hooks, spectacles made of rock crystal, a hat stand, a lamp especially designed to keep mosquitoes away, soap, brushes, mariner's compasses and sun dials.

The hard pillows are decorated with various kinds of designs, one having a picture of the Kilin, a fabulous animal about which the Chinese have a legend similar to ours about the stork bringing children.

For heating, in central and southern China, metal braziers filled with charcoal are placed in the room. The general tendency is to keep the body warm by the addition of clothes rather than by heating the room. Pillows serve largely for the support of the neck, and some have an opening in one end so that they may be filled with hot water in the winter and with ice in the summer.

Distinguished Visitors

Among distinguished visitors to Field Museum during May were Major-General Sir Francis Younghusband, M. Maxime Ducrocq, Colonel Theodore Roosevelt, and Dr. E. L. Gill. Sir Francis is well-known for his explorations in India, Tibet, Turkestan, the Pamirs, Chitral, Transvaal, and elsewhere. He was British Commissioner to Tibet for several years, and is the author of numerous books. M. Ducrocq is a noted French sportsman, and Président du Conseil International de la Chasse. He visited Chicago in the course of a trip around the world in the interest of promoting wild life protection. Colonel Roosevelt took the opportunity to inspect a number of the new Asiatic groups in William V. Kelley Hall, including several for which he had collected specimens. Dr. Gill is Director of the South African Museum at Cape Town.

GROWING MEXICAN PLANTS IN CHICAGO GARDENS

By Paul C. Standley
Associate Curator of the Herbarium

It is well known that many basic economic plants of the United States such as corn or maize, beans, cotton, and tobacco, besides peppers and other plants of minor importance, originated in Mexico. That country is the source also of many ornamental plants popular in North American gardens.

Early writers commented upon the fondness of Mexicans for flowers, as evinced by beautiful gardens that existed in the Valley of Anahuac. Flowers were grown extensively in the neighboring country, and brought in boat loads to the market. Aztec emperors established a botanical garden of rare plants from all parts of their realm.

Love of flowers is just as pronounced among the Mexicans today as four hundred years ago, and flowers are displayed as lavishly as ever in the markets. Even the humblest homes are almost always surrounded by gardens, with a great variety of flowers of the kinds esteemed before the coming of the Spaniards, and in addition many others from the Old World, as well as some, like the California poppy and gaillardia, from the United States.

Some Mexican plants must have been in cultivation many centuries, for they are no longer known in a wild state. It is now decidedly uncertain whether some had their origin in Mexico or South America, for they seem to have been widely dispersed at the time of the conquest. Double-flowered forms, too, seem to have been as well established then as now.

Mexican plants most common in our gardens are cockscomb, bachelor's-button or globe amaranth (*Gomphrena*), four-o'clock, marigold, and zinnia. None of these grows at present in a really wild state. The zinnia is so popular in this region that it has been designated as the state flower of Indiana.

Other Mexican plants are cosmos in its various forms and colors, tuberose, spider-flower (*Cleome*), the poinsettia that fills florists' shops at Christmas time, some of the begonias and many of the popular cacti, perhaps some of the fuchsias (although these are mostly South American), moon vine, the lantana that is so popular in park beds, the lavender-purple ageratum, and, above all, the dahlias.

The poinsettia probably no longer exists in a wild state, but is a favorite shrub in Mexico and Central America. Those who know the poinsettia only as a potted plant can scarcely imagine its gorgeous effect when growing as a shrub or small tree.

The lantana as it grows wild is a weedy shrub in most parts of the American tropics, giving little promise as a decorative plant, for the bush is a coarse and straggling one, and the flowers are small and unattractive in color. Selective cultivation has improved it greatly. The inhabitants of tropical America regret that all the plants were not taken north, for they are pernicious weeds where native.

The ageratum, too, which is planted to form such handsome beds in some of the Chicago parks, is a despised weed in Mexico and Central America, where it behaves much like daisies or dog-fennel in the United States. When the native people are told that it is cultivated for ornament in the north they are greatly amused.

The truly wild dahlias of Mexico and Central America are far removed from the innumerable "improved" forms of our gardens, but many are not inferior in beauty. They are all of the single type, and particularly beautiful are the large, pure white ones, the plants of which often become shrubs or small trees. They produce an especially handsome effect when banked along mountain roads and trails. In some parts of Central America where dahlias are cultivated abundantly but are not native, both single and double forms have become troublesome weeds, especially in corn fields.

Besides the plants enumerated, many other Mexican ones occasionally occur in the gardens and greenhouses of Chicago. Some Mexican plants of notable beauty are highly prized in botanical gardens, but offer difficulties in propagation that prevent wider use.

Some of the best known Mexican plants are represented in the Hall of Plant Life (Hall 29) by accurate reproductions.

A loaf of bread baked in Egypt more than 3,000 years ago is exhibited among the collections of food plants and products in the Department of Botany.

PAINTING BY KNIGHT SHOWS STRANGE WINGLESS MOAS

By Bryan Patterson
Assistant in Paleontology

New Zealand is remarkable among the larger islands of the world for the fact that it possesses no native land mammals. This absence of mammals, particularly of the carnivorous forms, permitted the evolution of a number of peculiar flightless birds, of which the great majority are now extinct. The accompanying illustration depicts an evening scene in South Island and shows a number of the largest of these birds, *Dinornis maximus*, grouped about a small valley stream.

The members of the extinct order to which *Dinornis* belongs are known collectively as moas, a Maori name handed down from the time when the birds were hunted and eaten by the natives. Moas, to judge from the immense numbers of their bones which have been found, were at one time exceedingly numerous. The remains of more than twenty species belonging to five genera have been distinguished. These ranged in size from the giant *Dinornis maximus*, which probably attained heights of ten feet, down to small species of *Anomalopteryx* which was not over three feet high.

The moas were entirely flightless and possessed only small vestiges of wings. They were ostrich-like in general appearance but the larger forms were relatively bulkier and had more massive legs. The feathers were small and chestnut colored with a white tip. We owe this last piece of information to the excellent preservation, in dry caves in South Island, of specimens with the ligaments, dried skin and feathers still adhering to the bones.

The extinction of this once flourishing group seems to have been due to two causes. New Zealand, in common with other parts of the world, underwent a refrigeration of climate during the Pleistocene or glacial period. This reduction in temperature must have greatly reduced the number of moas. The survivors were exterminated by man. At various places on the islands have been found the so-called Maori ovens—old cooking pits where broken and charred moa bones and fragments of eggshell are mixed with stones and charcoal. The last moa was killed before the discovery of New Zealand by white men.

Before the coming of man the moas had natural enemies. Remains of a large eagle, *Harpagornis*, which doubtless preyed on the smaller species and on the young of the larger forms, have been found on both islands. The moas themselves fed on ferns.

The accompanying illustration has been taken from a mural by Charles R. Knight in Ernest R. Graham Hall (Hall 38). In the same hall are exhibited the skeleton of a small species of *Dinornis* and a life size restoration of *Dinornis maximus*.

Moas of New Zealand

One of the mural paintings by Charles R. Knight in Ernest R. Graham Hall. In a general way these huge wingless birds resembled the modern ostrich. Some reached a height of twelve feet.

MANY COLOR PLATES OF HAWKS ILLUSTRATE NEW BOOK

Field Museum has placed on sale an especially attractive book, *The Hawks of North America*, recently published by The National Association of Audubon Societies. Dr. John B. May, who has served as Director of Ornithology of the Massachusetts Department of Agriculture, and is a noted economic ornithologist and authority on birds of prey, is the author. The book is illustrated with 37 color plates by Major Allan Brooks, one of the foremost painters of birds. It contains also four black and white profile plates by Roger Tory Peterson, range maps for all species showing breeding areas and wintering limits, and flight patterns in black and white which are of practical value in identifying each species in the field.

Copies of the book may be obtained at the publication and post card counters in the Museum, at $1.25. If you desire a copy sent by mail, send your order with check or money order for this amount, and it will be mailed to you.

ANIMALS THAT ARE EQUIPPED WITH TRAP DOORS

By Karl P. Schmidt
Assistant Curator of Reptiles

The familiar sally about "crawling into a hole and pulling the hole in after oneself" comes to mind in connection with animals in which a part of the body is especially modified to close the hole or crevice in the ground in which they live or take refuge. Such hole-closing devices are found as part of the bodily structure of certain insects, a few frogs, lizards and snakes, and even (perhaps) one mammal.

Numerous frogs and toads have the top of the head developed into a bony casque. In certain South American tree frogs the head can be pulled down nearly at right angles to the body, and this is interpreted as enabling the frog to close the knot hole in which it lives. The most authentically described case illustrating this relation between habit and structure is that of a small Cuban toad which lives in short vertical burrows in the ground. It retires into its burrow backward, and the bony top of its head is bent sharply forward, effectively blocking the hole. The extreme development of spines on the tails of some lizards perhaps may function in the same way. At any rate, it is difficult to imagine a snake swallowing an Egyptian mastigure or an American spiny-tailed iguana tail foremost. Some of these lizards take refuge in cracks between rocks and can bend their tails sharply sidewise, which would effectively close a crevice.

Even more remarkable are the creatures which live in burrows in the soil and have sharply truncated or spiny tails. The most notable example is probably the burrowing snake *Uropeltis* of southern India, in which the tail terminates in a single large rugose shield at right angles to its axis and as broad as the body. It carries the rear door of its burrow with it. The pichiciego, a tiny burrowing armadillo of western Argentina, has so truncated a rear, covered with a special shield, that it is apparently a mammalian example of this phenomenon.

This relation between animal structure and life in holes or burrows has been called phragmosis. It requires much further observation to establish the extent to which it occurs and to verify its usefulness. Naturalists have hitherto been so much occupied with collecting and describing the rich life of the tropics that there has been little time for observation of habits under natural conditions or in the laboratory. This affords a fascinating field for study.

JAVANESE SCULPTURES

Ancient Javanese stone sculptures of four of the most potent deities of Indian mythology, are on exhibition in Hall G, devoted to the archaeology and ethnology of Malaysia. The statues, which date to about the beginning of the Christian era, indicate a high degree of artistic development on the part of the sculptors.

One represents Ganeca, god of wisdom and prudence, in the shape of an elephant as a symbol of sagacity. Its trunk rests in a water jar, but it has two pairs of human arms. This is one of the most popular of Indian deities, and almost every act in a Hindu's life begins with an invocation to Ganeca. The wisdom it represents is not that of knowledge, but worldly wisdom of the kind which results in financial success. Therefore it is particularly the god of the shopkeepers.

Another is the warlike and ferocious goddess Durga, to whom bloody sacrifices were offered. In another incarnation she is called Kali, "the Black One," goddess of death and destruction. Thugs murdered their victims in her honor.

The third of the gods is the Buddha Amitabha, who was the personification of light in the first century of the present era. He is believed to preside over a paradise in the west where faithful votaries will be reborn from lotus flowers to enjoy a state of eternal bliss. He was the most popular of Buddhas in the Far East.

Last is shown Civa, destroyer and creator, depicted in the garb of a Brahman ascetic, holding a trident symbolic of divine power.

Flying Reptiles

In a panel-exhibit, a yard square and carefully sealed up under glass, in Ernest R. Graham Hall (Hall 38), is the skeleton of a flying reptile. The bones are of a dark, brownish color, very thin and delicate. The body is the size of an eagle's and the wings had a similar spread. The skull is delicate, and ends in a long straight beak. The wing bones have been hollow, but now appear flattened like so many joints of reeds. There were three fingers armed with slender claws at the second joint corresponding to three fingers of the human hand; the fourth finger extended into slender bones to support a membranous wing. From this characteristic was derived the creature's name *pterodactyl*, or wing-finger.

Such flying reptiles lived over the inland seas of western Kansas during Cretaceous time, about one hundred million years ago. At death they fell into this old-time sea and eventually their bones were covered by the sediments gathering at the sea bottom. The Museum's specimen was found some years ago lying in a bed of natural chalk where ages of storm and rain had washed it bare.—E.S.R.

Structural Cements

Common clay, the first cement used by man for structural purposes, is still the most used of all. A collection of the various substances used for structural cement may be seen in Hall 36.

Rough diamonds from nearly all the important fields of the world, as well as several finely cut large specimens, are exhibited in H. N. Higinbotham Hall (Hall 31).

JUNE GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for June:

Week beginning June 3: Monday—Chinese Art; Tuesday—General Tour; Wednesday—Hall of Plant Life; Thursday—General Tour; Friday—Ancient Burials.

Week beginning June 10: Monday—Animal Habitat Groups; Tuesday—General Tour; Wednesday—Hall of Races of Mankind; Thursday—General Tour; Friday—Fish and Reptiles.

Week beginning June 17: Monday—Amber, Turpentine and Rubber; Tuesday—General Tour; Wednesday—Prehistoric Life; Thursday—General Tour; Friday—Pewter and Jade.

Week beginning June 24: Monday—Egyptian Exhibits; Tuesday—General Tour; Wednesday—Birds; Thursday—General Tour; Friday—Geology Exhibits.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in Field Museum News. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From B. A. Krukoff—25 samples of seeds and fruits, Brazil; from Howard Scott Gentry—500 herbarium specimens, Mexico; from School of Forestry, Yale University—38 herbarium specimens, Colombia; from Rev. Brother Elias—45 herbarium specimens, Colombia; from Prof. Manuel Valerio—276 herbarium specimens, Costa Rica; from Dr. T. F. Seymour—a specimen of foliated talc, Canada; from Miss Elizabeth Oliver—a specimen of pisolite, Illinois; from Stewart Springer—11 lizards, Sardinia; from Dr. Auburn E. Brower—2 butterflies, Maine; from C. Blair Coursen—44 lizards and 2 frogs, Florida; from Chicago Zoological Society—a short-headed flying phalanger, New Guinea; from Leslie Wheeler—17 hawks and 3 owls, Costa Rica and Canada.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from April 16 to May 15:

Non-Resident Life Members

John Wyatt Gregg

Associate Members

Mrs. Gustavus Babson, Dr. Ralph B. Bettman, Robert N. Golding, R. G. Hollingsworth, Mrs. Frank K. Hoover, George E. McGrath, George F. Mulligan, Mrs. Lloyd F. Neely, Miss F. A. Reffelt, Benjamin J. Rosenthal, Miss Shirley Jane Short, Floyd E. Thompson, Edward E. Voynow, Charles Weiner.

Annual Members

Comfort S. Butler, Mrs. Chester W. Chapin, Dr. Bowman Corning Crowell, Joshua D'Esposito, L. J. Drake, Lyman M. Drake, Miss E. L. Drew, Mrs. Thomas E. Duffy, Miss Ruth M. Engberg, Frank C. Huffman, Everett B. Michaels, Lorry R. Northrup, Patrick B. Prescott, Jr., William A. Rowley, E. B. Thurman, Rudolph E. Vogel, Carl J. Zipprich.

Research by Noted Paleontologist

Dr. William Berryman Scott, Professor Emeritus of Princeton University, recently spent several weeks at Field Museum, engaged in research on skeletons of fossil *Astrapotheres* in the Museum's collections. The results of his research are to be made the subject of a scientific publication. Professor Scott is the former Blair Professor of Geology and Paleontology at Princeton, and is well-known as one of the world's leading authorities in his fields of study.

Specimens showing all stages in the manufacture of lead pencils form an economic exhibit in the Department of Geology.

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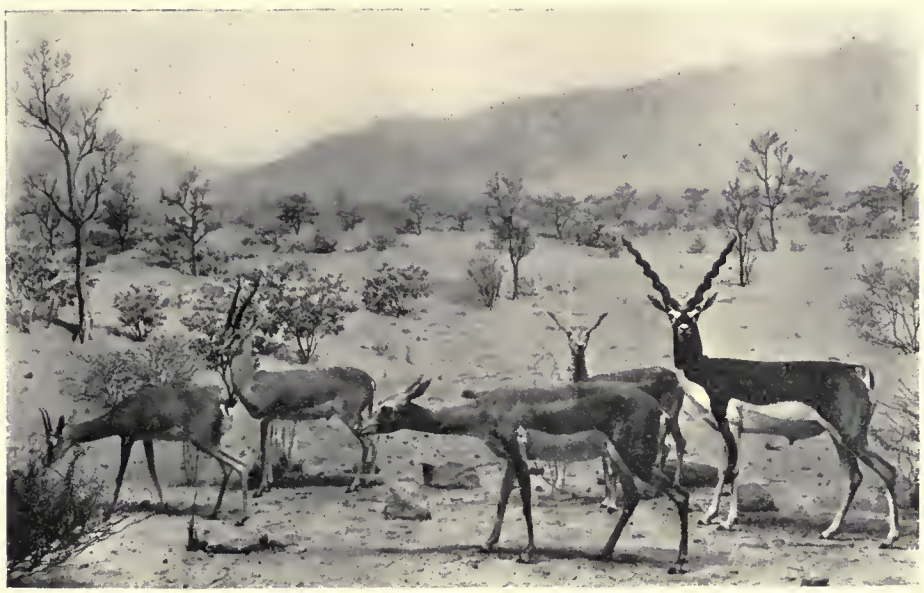
BLACKBUCK AND CHINKARA, ANTELOPES OF INDIA, MAKE ATTRACTIVE GROUP

By Wilfred H. Osgood
Curator, Department of Zoology

The third group to be completed in William V. Kelley Hall (Hall 17) during the present year, and the fourteenth in the hall, is one in which two species are shown. These are the Indian antelope or blackbuck and the Indian gazelle or chinkara, which inhabit similar semi-arid parts of India and at least occasionally may be found closely associated. They are highly characteristic Indian animals for, although several other antelopes reach the northern and western borders of the country, these two are the only representatives of their kind throughout peninsular India except the much larger nilghai and the shy, skulking four-horned antelope. The antelopes of India do not compare in numbers with those of Africa, but much interest has been concentrated on them during the long British occupancy.

The two species exhibit several contrasts, the most notable being in the secondary sex characters, one showing much difference between the sexes and the other very little. In the blackbuck, the male is conspicuously different in color from the female, and the male has well developed horns while the female has none. In the chinkara, the sexes are alike in color and both male and female have horns. Among antelopes there is great variation in such characters, whereas in the deer family, with very few exceptions, the males are horned and the females hornless.

The name blackbuck, originally applied only to the males, is now in general use for the species and it is not uncommon to see or hear the contradictory expression "female blackbuck," although the female is neither black nor a buck. The species is one of the oldest known to civilized man and it is not unlikely that it was brought captive to Europe in the time of Alexander the Great. It thrives in captivity and is often seen in zoos and private parks. Its natural home is open grassland of which there is more in central India than generally supposed.



Graceful and Fleet of Foot

The blackbuck (on the right), and the chinkara (left), two species of small antelopes common to India. Note the spiral horns, especially those on the blackbuck, which are the most corkscrew-like found on any antelope.

Like other animals of the plains it is keen of sight and swift of foot. In fact, it is claimed by some that it is the swiftest of all four-footed animals. Whether this claim can be substantiated or not is doubtful, for it is unlikely that a test for the championship with other claimants to the title can ever be arranged. Anglo-Indians, however, who have also hunted in Africa, insist that it is faster than any animal of that continent. One writer (Dunbar Brander) very seriously says: "I believe that if it were possible to enter a herd of blackbuck for the Derby and their pace were to be regulated by the slowest animal in the herd, they would come in a solid mob well in front of the horses and, given anything in the nature of jumps or uneven ground, the relative speed of the buck and the horse would be further accentuated." Besides speed and endurance, the blackbuck has unusual agility and flashing quickness of movement which have given it distinction as a high-jumper as well as a runner. The playful exercise of these qualities is often seen in undisturbed herds on their feeding grounds when one after another springs lightly over the backs of its companions.

The chinkara is so-called by natives, although in books it is more often nominated as the Indian gazelle or Bennett's gazelle. It reaches a weight of only fifty to sixty pounds and is a delicately formed creature of nearly uniform tan color. It ranges somewhat more extensively than the blackbuck and is inclined to frequent light scrub rather than grassgrown plains. In such places drinking water is often scarce or quite absent, but the chinkara seems to suffer no discomfort. A certain minimum of moisture is essential but, like some other antelopes and rodents, it obtains enough from the herbage it eats.

The Museum's group, for which specimens were collected by the James Simpson–Roosevelts Asiatic Expedition, and by the late Colonel J. C. Faunthorpe of Bombay, includes a male and two females of the blackbuck and a male and female of the chinkara. It was prepared by Staff Taxidermist Arthur G. Rueckert, assisted by Mr. William E. Eigsti. The background was painted by Staff Artist Charles A. Corwin from studies made through the cooperation of the Bombay Natural History Society.

Cave Scenes Shown

Six colored transparent pictures of the interior of the Luray Caverns of Virginia have been placed in windows near the exhibit of cave formations in Clarence Buckingham Hall (Hall 35). These explain the nature and occurrence of the exhibited stalactites and stalagmites better than the labels can. They show multitudes of stalactites hanging from the cave roof like icicles, and stalagmites growing upwards from the cave floor below.

The stalactites look like huge icicles because they are formed in much the same way, by water dripping through the leaky cave roof. Instead of the water freezing to form an icicle it evaporates. As it is hard water it leaves, when it evaporates, a residue of carbonate of lime which is the stalactite. Any water that does not evaporate drips from the point of the stalactite to the cave floor where, upon continued evaporation, it builds upwards a column of carbonate of lime which is a stalagmite.

The varied, fantastic and beautiful shapes produced are strikingly illustrated by the transparencies. These transparencies, and a number of stalactites and stalagmites, were recently presented to the Museum by the Luray Caverns Corporation.

Meteorites Seen Falling

Fifty-two per cent of the more than 700 meteorites in the Museum collection were actually seen to fall. The others were identified as meteorites through peculiarities of structure and composition not found in anything of earthly origin.

The mariner's compass, of which several Chinese examples are displayed in George T. and Frances Gaylord Smith Hall (Hall 24), is an ancient Chinese invention which was brought to Europe by the seafaring Arabs.

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FIELD MUSEUM NEWS

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CONTRIBUTING EDITORS

Paul S. Martin.....*Acting Curator of Anthropology*
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Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
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EXHIBIT OF FOREIGN BIRDS INTRODUCED IN AMERICA

By Rudyerd Boulton
Assistant Curator of Birds

In the May issue of Field Museum News there was announced the installation of an exhibit of extinct North American birds in Hall 21. Eight of the twelve species that have totally ceased to exist are shown, from the great auk, last recorded in 1844, to the heath hen, which became extinct on Martha's Vineyard in 1932.

To complete the picture of the changing bird fauna in America, a similar exhibit of introduced foreign birds was recently installed in the same hall by Staff Taxidermist Ashley Hine, who has since resigned.

In 1850, six years after the first American bird, the great auk, became extinct, English sparrows were imported and released in Brooklyn for their supposed value in controlling insect pests of agriculture. It is true that an occasional swarm of army worms has been exterminated by English sparrows, and during the nesting season the young birds are fed largely on insects, but the plans of the persons responsible for the introduction have gone far astray. Disease is spread on poultry farms by sparrows, economically valuable native birds are harassed and driven away, and damage to agriculture exceeds the benefits.

It is a surprise to many people to know that the English or house sparrow is not closely related to our own native sparrows. He actually belongs to the great family of weaver birds, all of whose members have their native home in the Old World.

The other most obvious foreigner among our native birds is the European starling. Introduced in New York in 1890, it did not become well established for some time, and only in recent years has it become common in the Chicago area. Its food habits recommend it more to our tolerance than those of the house sparrow, but as the starling is partially migratory (the house sparrow is a resident) it is potentially a source of widespread danger. The starling's habit of gathering in huge flocks in fall and winter and using city buildings for its roosting places has caused much damage.

Both sparrow and starling are here to stay. There is no possibility of eliminating them, for their numbers are legion and they occupy very extensive territory.

Two game birds, the ring-necked pheasant and the European partridge, are well established in many regions. They will never become economic problems because the annual toll taken by fall hunting will keep their numbers within bounds. It is unfortunate that the many thousands of dollars spent in transplanting and propagating these birds could not have been spent in conserving our own native game birds which, without question, furnish better sport from the true sportsman's point of view, as well as being economically more valuable to agriculture.

The Chinese spotted dove and the ringed turtle dove have been introduced in California, the skylark on Vancouver Island, the European goldfinch on Long Island, the European tree sparrow near St. Louis, and the crested mynah in British Columbia. None of these have as yet become economically important. Many other attempted introductions have failed.

If an exotic form is able to establish itself in a new home, it generally means that it is escaping some controlling factor in its original environment that kept its numbers within reason. No one can predict what that may be. For that reason, government regulations are now in effect to control the wholesale introduction of any birds or animals.

RARE BOTANICAL WORK ADDED TO LIBRARY

By B. E. Dahlgren
Curator, Department of Botany

In the work of Field Museum on plants of the American tropics the library of the Department of Botany has gradually acquired most of the publications of importance in that particular field.

A recent addition, Velloso's *Flora fluminensis*, is sufficiently voluminous and curious to deserve special mention and has, besides, an unusual history. With its eleven volumes of folio size plates it is inferior in bulk only to Martius' great *Flora of Brazil* (long in the library) with which it naturally invites comparison. But the well-known work which bears the name of Martius is the result of the labor of dozens of specialists working in European institutions during the latter half of the nineteenth century.

Velloso's flora, published in 1825, is a product of the century preceding, having been written before 1790. It was the work of a Franciscan brother occupied with the collection and description of plants in Minas Geraes and later in the Rio de Janeiro region. The sixteen hundred odd plates that form the bulk of the publication were largely the work of his companion Soldano, likewise a Franciscan, but various other draftsmen are also listed as contributors. After the death of the chief author these plates were preserved in the National Library where they might have remained unpublished indefinitely but for the appearance of some parts of a botanical publication of Martius that were brought to the attention of the young emperor of Brazil, Dom Pedro I.

According to a contemporary story, told by Martius himself, Dom Pedro is said to have exclaimed: "Must foreigners come to describe our plants? Could we not do this for ourselves?" Informed by his father confessor of the existence of Velloso's manuscript he immediately ordered its publication, authorizing the embassy in Paris to arrange for the engraving and printing of the plates by one of the foremost lithographic houses of Europe.

While this work, begun on a sumptuous scale, was still under way the political situation forced the emperor's abdication and return to his native land, Portugal. Velloso's flora was forgotten for the time being and the flow of funds for its publication interrupted. The mill furnishing the paper had apparently not then been paid in full and on the strength of its claim the entire edition was seized from the engravers. A considerable part of the still unbound plates is said to have been sold for cartridge paper to the government of France, which was then engaged in a war in Algeria.

Field Museum's copy is one of a number which were salvaged and presumably delivered in the course of time to the Brazilian government. It is in an excellent state of preservation. The very high grade of handmade paper on which it is printed remains, after a hundred and ten years, almost as perfect and fresh in appearance as if it were just off the press.

The belated publication of this work, undertaken more than thirty-five years after it was written, is said to have cost the Brazilian imperial government a million francs, a very large sum for its day.

FIELD MUSEUM EXHIBITS WORLD'S ONLY ARTICULATED SKELETON OF ASTRAPOTHERIUM

By Elmer S. Riggs
Associate Curator of Paleontology

One of the most treasured specimens of South American fossil mammals has been added recently to the collections in Ernest R. Graham Hall (Hall 38). It is a unique skeleton of the strange beast *Astrapotherium magnum*. This is the first articulated skeleton of this animal known, and the first to be placed on exhibition in any museum. Also, it is the first specimen of the entire order, Astrapotheria, to become so fully known.

Astrapotherium Magnum, a Unique and Important Fossil Exhibit

A skeleton of an extinct South American mammal which is of extreme interest to paleontologists, now on view in Ernest R. Graham Hall. In mounting the skeleton it has been posed to represent the position of the animal lying down. *Astrapotherium*, in standing position, was about five feet in height, and nine and one-half feet in length.

From this specimen it becomes possible to establish definitely the relationships of this group of animals to other great orders of extinct South American mammals.

The *Astrapotherium* lived during the Miocene period, about twelve million years ago. The skeleton shows that it stood nearly five feet in height and was nine and one-half feet long. The head was massive, and the mouth was armed with four strong tusks somewhat like those of the wild boar.

The upper tusks, triangular in cross-section, curved downward to meet a shorter pair in the lower jaw. The nasal opening was wide, and opened upward and forward much like that of the modern tapir. Apparently it was surmounted by a large pouchy nose and a prehensile upper lip which filled out the open space above the lower jaw and served the animal in grasping its food.

The lower incisor teeth are broad and have rounded, chisel-shaped crowns. The evidence of wear on these teeth shows that they were opposed by some part of the mouth not preserved in the bony structure—probably the prehensile upper lip. The molars are similar to those of certain river rhinoceroses, and adapted to feeding upon fleshy plants. The back of the palate is not bridged over by the bony structures common in animals which feed under water.

The neck of *Astrapotherium* was moderately long for an animal of its stature. The body was rather long and slender with a deep, narrow chest. Twenty-four body vertebrae are present in the skeleton and nineteen pairs of ribs. The forelegs are rather long and strong as is consistent with a deep and well-muscled shoulder. The forefoot had five toes which were enclosed apparently in a fleshy pad like that of the elephant. The hind legs were much more slender than the forelegs and the entire hind quarters were relatively light. The hind foot was of the plantigrade structure in which the entire sole of the foot rests upon the ground. The foot is so slender and the bones so weak in proportion to the size of the animal as to indicate that the weight was borne upon a pad which enveloped the entire sole of the foot.

The unusual features in the structure of this animal are receiving detailed scientific study from well-known paleontologists, notably Dr. William Berryman Scott of Princeton University, an eminent authority on South American mammals. His forthcoming publications may be expected to throw much light on the systematic position and the relationships of this most bizarre animal.

In general it may be said that *Astrapotherium* was a low-ground or a river-frequenting animal which fed upon fleshy, moist plants such as canes or rushes, much as the modern hippopotamus does. It may have swum in lakes or rivers. The animal was first reported nearly eighty years ago and has since become known from various specimens consisting of teeth, jaws and a considerable number of entire skulls. These specimens have been found most abundantly in formations of Miocene age in southern Argentina. More recently specimens of related animals have been found in Uruguay, Colombia and Venezuela.

FAMILY TREE OF REPTILES

By D. Dwight Davis
Assistant, Department of Zoology

The genealogy of reptiles is a long one, extending back into the earth's history more than two hundred million years. They reached the peak of their struggle for supremacy long ago, and now, reduced in numbers, only a handful of mostly small and highly specialized types remains.

The actual beginning of the reptile line is a secret that probably never will be known. It must have taken place some time during the Carboniferous Era, or Coal Age, but the fossil record is not very clear. During the Mesozoic Era, or "middle age" in the earth's history, reptiles underwent an extraordinary differentiation. An abundance of fossils shows that they dominated the entire animal world. Grotesque pterodactyls occupied the air before there were any birds; fishlike ichthyosaurs, together with mosasaurs and turtles, inhabited the ancient waters; while dinosaurs were the predominating land animals. Although some of these animals, such as the well known *Brontosaurus*, reached the size and weight of a railroad locomotive, most of them were small. Indeed, some of the most interesting were no larger than a chicken.

The dramatic rise and fall of the reptile line is in itself a fascinating topic that has attracted many students. From the evolutionary standpoint, however, this is overshadowed by the still more interesting part they have played in the history of vertebrates. Just as the amphibians grade almost imperceptibly into the reptiles in the Carboniferous, so do certain reptilian groups gradually take on the characteristics of mammals and birds at a later time. The famous Karoo beds of South Africa have yielded fossils which, although true reptiles, are more like mammals in nearly every feature of their anatomy. Some of the small dinosaurs, on the other hand, become increasingly birdlike.

It is thus apparent that reptiles stand at one of the great crossroads in the history of life on the earth. Although they themselves represented a distinct advance over their amphibian ancestors, their descendants, birds and mammals, far outstripped them, and even brought about their undoing. Birds and mammals, with their superior intelligence, their warm blood, and their higher organization, rapidly usurped the dominating position so long held by reptiles, and have since reduced them to a few small and relatively unimportant survivors—the crocodilians, lizards, snakes, and the turtles.

An exhibit depicting the central place in vertebrate history held by reptiles has recently been installed in Hall 19, together with skeletons of each of the surviving groups. This exhibit was prepared by Mr. E. N. Gueret and the writer from data recently published by Dr. A. S. Romer. Many of the extinct forms are exhibited in Ernest R. Graham Hall (Hall 38).

HISTORY OF LEMONADE

With the season for iced drinks here, it is interesting to find that lemonade has a long and honorable history in the Orient. According to an article by the late Dr. Berthold Laufer, former Curator of Anthropology, lemonade was a favorite beverage of the Mongol emperors in China, and they were so fond of it that they appointed a special official of high rank to take charge of its constant preparation. Dr. Laufer wrote, in part:

"Mar Sergius, a Nestorian Christian, who founded a Nestorian church at Chenkiang in A.D. 1281, was reputed, as were his ancestors, for his ability to prepare sherbets (including lemonade), and the emperor bestowed upon him a diploma in the form of a gold tablet, granting him the privilege of especially applying himself to that occupation. Mar Sergius was obliged to send to the court annually forty jars of sherbet prepared from the juices of lemons, grapes, quinces and oranges. These beverages were believed to have curative powers. On various occasions this official lemonade maker was ordered to make special journeys post haste to various points in the empire to prepare the drinks for special functions.

"Of the numerous useful fruits that we owe to India the lemon is the most democratic and most widely known. It has become a denizen of the world, and, with its Indic name, has penetrated even into the darkest parts of Africa and the tropical jungles of South America. Next to the word 'tobacco' the word 'lemon' is the most universal, reverberating with only slight modifications from every tongue of the globe.

"The earliest references to lemons in India on the part of European travelers are by a Friar Odoric of the fourteenth century, who on a visit to Ceylon described a pool full of precious stones, and abounding in leeches. The king, he related, allowed the poor to search the water for the stones once or twice a year, and to take whatever they could find. But in order that they might be able to enter the water in safety they bruised lemons and copiously anointed their bodies with the juice to keep the leeches from biting them."

SUMATRAN WEDDINGS

Among the Menangkabau tribe, of central Sumatra, marriage is a really serious matter. Contrasted to the spur-of-the-moment weddings contracted in perfunctory ceremonies at some of our Gretna Greens, where a few hours' or even a few minutes' acquaintance may be a couple's only preliminary to matrimony, the Menangkabau go through eight solid days of elaborate and solemn ceremonials, culminating in a grand finale of feasting and dancing on the final day.

In Hall G (devoted to ethnology of the Malay Peninsula and Malay Archipelago) there are exhibited life size models of a Menangkabau bride and groom, dressed in the elaborate garments used on such an occasion. The trappings for these figures were collected for the Museum by the Arthur B. Jones Expedition to Malaysia.

A Menangkabau wedding is strictly an affair of the matriarchal family. A representative of the family negotiates the match, sets the time, and prepares the wedding feast. The garments worn by the bride are family possessions, and are used for generations.

The dresses shown on the Museum's models are typical of those worn by the bride and groom on the final day. The bride wears skirt, jacket, and shoulder cloth of silk with designs in gold and silver thread. On her head and about her neck she wears the typical ornaments of a bride, while her wrists support huge bracelets covered with thin gold plate in design. On the fifth finger of her hand is a long golden fingernail protector—a result of Chinese influence.

The groom is dressed less elaborately than the bride, but his garments show some of the best weaving of the tribe. The lower

Menangkabau Bride and Groom

Life-size models of native Sumatrans in the elaborate trappings worn on the wedding day, exhibited in Hall G.

borders of his jacket and sleeves have designs woven in gold thread, while similar designs appear on the trousers and belt. Thrust into his belt is the kris or fighting knife, traditional weapon of the Malay.

SPHERICAL CONCRETIONS

Visitors sometimes inquire why some of the concretions in the large collection in Clarence Buckingham Hall (Hall 35) are spheres. Concretions assume many fantastic forms, but when grown under ideal conditions they are spheres as is illustrated by a recent addition to the collection presented by Mr. A. F. Sitterle, of Chicago. A study of this sand-calcite concretion, partially embedded in its sandstone matrix, may make the reason for the ideal form easier to understand.

This concretion was formed in a sandstone bed by growth, from the center, of a mass of minute calcite crystals which fill spaces between the grains of sand. The sandstone is of the variety called freestone, made up of uniform grains with the porosity equal in all directions. The concretion grew by the deposition of carbonate of lime from hard water which slowly percolated through the porous stone. This deposit from hard water is not unusual—it accounts for the scale formed in steam boilers and tea kettles.

The concretion started as a single crystal of minute size or by the coating of a small nucleus and grew outwards. The reason for its spherical form is merely the absence of any reason for another shape. With conditions uniform on all sides of the growing mass there is no reason why it should grow faster in one direction than another. If it grows equally in all directions the shape is necessarily that of a sphere. The reason why more concretions are not spheres is that ideal conditions are as seldom encountered where concretions are growing as they are elsewhere. —H.W.N.

GUIDE-LECTURE TOURS

During July and August the conducted tours of the exhibits under the guidance of staff lecturers will be given on a special schedule, as follows:

Mondays: 11 A.M., Halls Showing Plant Life; 3 P.M., General Tour.

Tuesdays: 11 A.M., Halls of Primitive and Civilized Peoples; 3 P.M., General Tour.

Wednesdays: 11 A.M., Animal Groups; 3 P.M., General Tour.

Thursdays: 11 A.M. and 3 P.M., General Tours.

Fridays: 11 A.M., Minerals and Prehistoric Exhibits; 3 P.M., General Tour.

There are no tours on Saturdays, Sundays, or the July Fourth holiday.

Persons wishing to participate in the tours should apply at the North Entrance. The tours are free, and no gratuities are to be proffered. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Helmuth Bay—15 specimens of woods, Norway; from School of Forestry, Yale University—37 herbarium specimens, Ecuador; from Robert M. Zingg—21 herbarium specimens, Mexico; from Professor Manuel Valerio—25 herbarium specimens, Costa Rica; from Leslie Wheeler—43 owls, 11 hawks, and a vulture; from J. H. Dekker—a fox and a badger, Iraq; from Henry Dybas—6 snakes, Indiana; from Chicago Zoological Society—4 lizards, 2 sand snakes, a caracal, and a desert monitor; from Bruno Schoemann—3 snakes, Brazil; from Dr. W. E. Hoffmann—8 turtles, South China; from H. B. Conover—a mallard duck and a ground dove, Illinois and Brazil; from Sir Charles Belcher—an orange-crested manakin, British Guiana; from General Biological Supply House—2 salamanders, Portugal; from Lincoln Park Zoo—a polar bear skeleton; from Howard Cleaves—a bobwhite, Wisconsin; from Otto Aubert—a porcupine skeleton, Wisconsin; from Frank L. Thomas—a native copper glacial boulder, Indiana.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from May 16 to June 15:

Associate Members

Mrs. Clarence A. Burley, Walter L. Cherry, Jr., W. S. Clithero, Miss Elsa W. Junker, Sigmund Kunstadter, Mrs. William P. Martin, Samuel R. Noble, Samuel J. Walker.

Annual Members

Horace White Armstrong, Edward Buker, Miss M. M. Capper, Carroll G. Chase, Samuel T. Chase, James F. Clancy, Mrs. Schuyler M. Coe, R. Cooper, Jr., Leonard S. Florsheim, D. B. Fulton, Mrs. Cora S. Hirsch, Warren C. Horton, Morton D. Hull, Mrs. Franklin Marling, Jr., Jesse L. McLaughlin, Alfred C. Meyer, J. H. Millsaps, Montrose Newman, Mrs. Leslie H. Nichols; W. H. Parker, Dr. William Raim, Mrs. W. W. Rice, Cranston Spray, Mrs. Leslie Berwyn Steven.

Noted Orientalists Visit Museum

Three of the world's most noted authorities on Chinese art and archaeology, sojourning in Chicago recently, visited Field Museum on June 12 to inspect the Oriental collections of this institution. These visitors, all from England, are Mr. George Eumorfopoulos, founder of the famous Eumorfopoulos Collection recently purchased by the British nation for the Victoria and Albert Museum; Mr. Robert Lockhart Hobson, Keeper of the Department of Ceramics and Ethnography in the British Museum, and cataloguer of the Eumorfopoulos Collection; and Mr. Oscar Raphael, a well-known private collector. A fourth member of their party, Sir Percival David, who has published many important catalogues of Oriental art, was unable to accompany the others on the Museum visit.

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SKELETON OF HUGE MEGATHERIUM, GREATEST OF GROUND SLOTHS, EXHIBITED

By Elmer S. Riggs
Associate Curator of Paleontology

In any collection of ground sloths, a specimen of the great Megatherium naturally takes first place. Not alone his great size and peculiar characteristics command for him that position, but his early discovery on the pampas of Argentina and his wide distribution over the two Americas have made him the best-known of the ground sloths.

A mounted skeleton of *Megatherium americanum*, the largest species of this animal, has just been placed on exhibition in Ernest R. Graham Hall (Hall 38) of Field Museum. This skeleton replaces a plaster cast, copies of which have been exhibited in many museums. From these casts, as well as from figures reproduced in many text-books, this animal has become widely known.

The skeleton as mounted has a length of eighteen feet from the nose to the end of the tail. The body is very broad in proportion to its length, much broader than was represented by the older casts and figures. The head, nearly a yard in length, is deep and massive in proportions. The lower jaw in the portion which supports the molar teeth is especially massive. The jaws, both above and below, are armed with great prismatic molar teeth, eight inches in length and deeply set in their sockets. These teeth grew continuously throughout the life of the animal and were pushed out from below to compensate for the wear at the crown. The great length of tooth was made necessary by the entire lack of the hard enamel coating which serves in protecting the teeth of most other mammals. There were no front teeth either above or below. The temporal arches are extended into long processes which furnished greater surface for attachment of the temporal muscles, the source of power in grinding the food.

The forefeet are prehensile and are armed with three long claws each. The hind legs are relatively short and massive, measuring fourteen inches across the knee-joint. The hind feet are so constructed that in the standing position they turn outward in an awkward manner unlike that of any modern mammal. The weight was thus borne upon the side of the foot and upon the great projecting heel. The single massive and strongly curved claw was apparently used as an anchorage to the ground when the animal reared upright in feeding. The tail served as a third support in that position.

Megatherium Americanum, a Giant Eighteen Feet Long

Probably the only complete skeleton in any North American museum of this largest species of fossil South American ground sloths, this specimen was collected by the Second Marshall Field Paleontological Expedition to Argentina. It has been assembled by Preparator Phil C. Orr and placed on exhibition in Ernest R. Graham Hall.

The ground sloths were plant-eaters, feeding upon the leaves and fruit of trees and upon roots and tubers. The strong, claw-bearing forefeet were equally well adapted to pulling down branches of trees and to digging in the earth for food. The accompanying photograph of the skeleton shows the animal reared upon the hind legs while the forefeet are resting upon a branched tree. In this position Megatherium may have often fed upon the sweet and much-prized seed pods of the algaroba tree which is widely distributed through the regions it inhabited.

More than fifty species of ground sloths have been reported from various sections of South America. The entire sloth tribe originated there about 40,000,000 years ago, and was confined to that continent until land connections were established between North and South America at the Isthmus of Panama. Later, many species of these animals came northward and have left their fossil remains abundantly in the asphaltum pools of Los Angeles and less numerously in other parts of the United States.

In South America at least one species of ground sloth is believed to have survived until after the appearance of man on that continent. Fresh bone of one species of these animals (*Glossotherium listai* Ameghino) as well as quantities of dried skin with hair intact, ordure, and other evidences of animal presence, were found forty years ago in a cave-shelter at Last Hope Inlet, Patagonia. The presence in the same shelter of quantities of cut grass has been taken as evidence that man and sloth inhabited the cave at about the same time. Megatherium lived about 20,000 years ago.

The skeleton of Megatherium recently placed on exhibition in Field Museum was collected by the Second Marshall Field Paleontological Expedition to Argentina and Bolivia in 1927. It was found in a high, eroded bank of the River Quequen Salada at the south coast of the Province of Buenos Aires, Argentina. Portions of the hind legs, pelvis and tail had been eroded away. These have been replaced by parts of a somewhat more slender animal from another locality. The original skull belonging to this skeleton is exhibited in a neighboring case along with specimens of seventeen other species of South American ground sloths.

The processes of printing and wood engraving employed in China and Tibet are illustrated by exhibits in the Department of Anthropology.

An exhibit of the fibrous minerals from which asbestos is made, with specimens of a wide variety of asbestos products, is included among the Museum's economic geology collections.

Field Museum of Natural History

Founded by Marshall Field, 1893
Roosevelt Road and Lake Michigan, Chicago

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Stephen C. Simms, *Director of the Museum*.....*Editor*

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COLLECTION OF REEF FISHES FROM THE SOUTH SEAS

By Alfred C. Weed
Assistant Curator of Fishes

Field Museum has received, from the recent expedition of the John G. Shedd Aquarium to the South Seas, a large and very valuable collection of fishes taken in Hawaii and Fiji. Most of the collecting was done on the reef at Suva and around the coral reefs, beaches and rocky shores near Honolulu.

The work of collectors of fishes is often thought of as fishing with hook and line or nets, or else buying specimens caught by market fishermen. On this expedition there was a large amount of more violent exercise. Many hours were spent in turning over large blocks of coral to find the small, brilliant fishes that had hidden under them during low tide. Large coral heads were broken up with hammers to get out fishes that had taken refuge inside.

Some little rock skippers were found in tide pools on the lava shores. When the collectors came near these pools, some of the fishes would rush across the rocks and dive into the sea. The only way they could be taken was by having one man stand in the surf to catch them in a hand net after they had been herded into the water by the others. It is reported that they traveled over the wet rocks faster than a man could run.

Of course, there was also fishing with hook and line and some species could only be caught on the smallest hooks in the most violent surf. Not much fishing was done with long nets because of the coral, but dip nets were used freely.

Besides the labor of getting the fishes out of their hiding places, the men had to be careful not to be injured by the specimens they were taking. Some of the eels were vicious and made savage attacks when driven from the holes where they had taken refuge.

Many species with dangerously poisonous spines were brought back. Among them are: the lion fish, with long spines as thin, stiff and sharp as the finest needles, each with a poison gland near its tip; a black catfish marked with white stripes, that is as dangerous as any of the mad toms of our brooks; a fish that looks just like a lump of wave-washed coral covered with a growth of all manner of marine plants and animals, and a row of deadly spines along its back; and a fish that is sometimes called "stinging-fish." Most of these are simply called "poison-fish" by the natives and all are strictly avoided.

There are also many scorpion-fishes, with sharp, dangerous spines on head and back; surgeon-fishes, with sharp, knife-like spines on the sides of the tail; and tangs, that carry in sheaths at the sides of the tail sharp spines like small knife blades, that can be opened out and used as dangerous cutting weapons. Many of the other fishes had sharp teeth or spines which they tried to use on the collectors.

In the collection are many brilliant species of butterfly-fishes, wrasses, parrot-fishes, squirrel-fishes, trigger-fishes, file-fishes and others that have no names in English. There are several species of Amphiprion, a small reef fish that lives in close company with a sea-anemone. Every few minutes one of these fishes will settle down onto its pet anemone and rub its sides along the mass of tentacles. When the fish wishes to rest it will lie in the center of the sea-anemone, which will then curl its filaments around it.

In color, these fishes show the most amazing combinations of reds, blues and yellows, set off and accented by black and white. The alcoholic specimens for the study collection show none of this brilliant color and would hardly be recognized as the same fishes.

So far, the Museum has received about sixty species collected on the reef at Suva, Fiji, and about the same number from Hawaii. Since many of the species found at one place were not taken at the other, there will be nearly a hundred species in the entire collection.

SUN'S RAYS BREAK ROCK

By Henry W. Nichols
Curator, Department of Geology

A collection recently installed in Clarence Buckingham Hall (Hall 35) illustrates a destructive action of the sun's rays upon rock which seems to be little known to others than geologists. This destructive action is especially evident in western Iraq and eastern Transjordania, where most of the specimens shown were collected by Mr. Henry Field, leader of the Marshall Field North Arabian Desert Expedition of 1927–28.

Insolation, which means exposure to the influence of the sun's rays, has, in some climates, a destructive action upon surfaces of rock. The destruction is greatest in regions where the sunshine is hot, where there is a great difference between the temperature of day and night, and where the air is dry.

Naked rock surfaces are strongly heated when exposed to the sun's rays and cool rapidly by radiation at night. The rock surface expands when heated and contracts as it cools during the night. Strains induced by the continual expansions and contractions may become greater than the rock can endure. Fragments break away from the surface in the form of sand, gravel and chips. Even large fragments are broken from the parent rock in this way. This destruction is particularly evident in desert regions on account of the unusually favorable conditions there. The difference between the temperatures of day and night is extreme, the sunshine is hot, and the dryness of the air favors both rapid heating during the day and rapid radiation of the heat during the night.

Coarse-grained rocks like granite acquire a rough surface from the breaking away of individual crystals. Dense, flinty rock surfaces are often covered with pits of a characteristic form called conchoidal because the curved, often ridged, depressions suggest impressions left by shells or fragments of shell.

Other places where the effects of insolation are especially evident are exposed mountain peaks where in the rarefied atmosphere the heating effects of the direct rays of the sun are great and the cooling at night extreme. Much of the loose rock which mantles the tops and slopes of such peaks is due to insolation, although much of it is a consequence of the action of frost.

The collection of gems and jewels in H. N. Higinbotham Hall (Hall 31) includes a cut brown-pink gem tourmaline weighing 58 carats.

Of unusual interest among the reptile exhibits is the rare giant dragon-lizard of Komodo, which may be seen in Albert W. Harris Hall (Hall 18).

OSAGE ORANGE WOOD PRIZED BY INDIANS FOR BOWS

By Llewelyn Williams
Assistant Curator of Economic Botany

When the early French settlers landed in Louisiana in the seventeenth century and explored the surrounding territory they discovered many plants and trees that were new to them. West of the Mississippi, near a village of the Osage Indians, they found a number of small, thorny trees with globular, golden-colored fruit. Perhaps with scornful reference to the inedible qualities of the fruit, they called it Osage orange or mock orange, although it has no botanical relationship to the citrus fruits.

The compact, elastic wood of the Osage orange tree was prized by the Indians for making war clubs and bows—hence the French name *bois d'arc* (bow-wood), now corrupted to bodark. Chroniclers relate that the price of a bow was a horse and blanket. The wood is known in different localities by various other names such as bodeck, yellow-wood, Osage apple tree, or hedge tree. The scientific designation is *Maclura aurantiaca*, in honor of William Maclure, an eminent geologist.

The natural range of the tree is limited to southern Arkansas, Oklahoma, and Texas, the region of its greatest abundance being the valley of the Red River. In the south it was formerly planted to mark the boundaries of plantations and it is still used in the middle west for hedges.

Although the mock orange belongs to the same family as the mulberry and fig, its wood does not share the characteristic of softness found in their woods. Osage orange wood is exceptionally hard and heavy, noted for its strength and durability, its resistance to atmospheric changes, and its virtual incorruptibility in contact with the soil. The heartwood is brilliant yellow, but turns brown upon exposure. It takes a lustrous polish.

Osage orange wood is in demand for felloes of wagons used in sandy regions, insulator pins, fence posts, and bridge piling. The bark of the root yields a yellow dye used by the early pioneers on homespun cloth, and now employed as a substitute for dyes obtained from fustic.

An exhibit of Osage orange, showing trunk, a wheel section, and typical boards, with photographs of a tree and fruiting branch, has been added to Charles F. Millspaugh Hall of North American woods (Hall 26).

OCEAN BIRDS SHOWN

Specimens of the largest bird that flies, the most powerful of flying birds, various rare birds, and some very strange birds, are included in a new exhibit of ocean-ranging winged creatures recently placed on exhibition in Hall 21 among the systematic bird collections. The new exhibit includes twenty-seven species of loons, grebes, albatrosses, petrels, shearwaters, boobies, pelicans, tropic birds, cormorants, and frigate birds.

There is a fine specimen of the wandering albatross, an inhabitant of cold southern seas, which is the largest of all flying birds. This is the bird made famous by Coleridge in *The Ancient Mariner*. It is rivalled by another species in the exhibit, the frigate bird, which, although somewhat smaller, is rated as in many ways the most powerful bird that flies, according to Rudyerd Boulton, Assistant Curator of Birds. Frigate birds are trained by natives of islands in the South Pacific to carry messages like homing pigeons.

Also of special interest is the flightless cormorant which is found only on the Galapagos Islands and which in consequence of its isolated habitat and lack of any necessity or inclination to travel has wings of very much reduced size, making it a parallel in development to the extinct great auk. Shown also is the species of cormorant which the Japanese train to catch and retrieve fish, a ring being placed around the bird's neck to prevent it from swallowing the fish. The late Dr. Berthold Laufer, former Curator of Anthropology, wrote a monograph on this subject issued by the Museum in the Anthropological Series of publications.

All of these sea birds are more or less primitive or of low rank in the scale of evolution, it is stated by Mr. Boulton. The exhibit was prepared by Staff Taxidermist John W. Moyer. A wide range of habitats, from extreme polar to extreme tropical regions, is represented. Some of the birds were collected by Museum expeditions, among them the Rawson-MacMillan Subarctic Expedition, Cornelius Crane Pacific Expedition, Marshall Field Chilean Expedition, and the two expeditions sponsored by Mr. Leon Mandel, one to Venezuela and one to Guatemala. Other specimens were obtained through the courtesy of the Chicago Zoological Society.

The Wandering Albatross
Largest of all flying birds. This specimen is included in new exhibit of ocean-ranging birds in Hall 21.

EAR DEFORMATION IN AFRICA

The great aesthetic ambition in the life of a man or woman of the Akikuyu tribe in Kenya Colony, East Africa, is to make the lobes of his ears touch his shoulders. An exhibit of the devices used for this purpose is included among the African ethnological collections in Hall E.

This process of "beautification" of the ears, like many other deformations practised by primitive peoples, is begun in early childhood, when small perforations are made in the ear lobes of boys and girls. The ears are gradually extended to greater and greater length by the periodical introduction of larger and larger ornaments. Disks of wood, heavy spirals of copper wire, gourds, cane peg, and many other objects are hung from the perforated ear lobes and worn year after year. The museum collection consists of examples of the various objects thus used. Photographs of natives, taken in the field by a Museum expedition, showing how they appear with their huge ear pendants and other paraphernalia, are likewise exhibited. Also displayed are artifacts relating to other phases of the primitive life of these people.

COLLECTION OF WOODEN MODELS FROM EGYPTIAN TOMBS

How the ancient Egyptians visualized the projection of the normal activities of life on earth to the hereafter is well illustrated in a collection of wooden model groups of people and various objects of every-day use, on exhibition in Hall J. These models were buried in graves of the Old Kingdom (2500 B.C.) and the Middle Kingdom (2000 B.C.).

Starting in the Old Kingdom time with single figures of the dead themselves, their children, and their household servants, which, it was believed, would serve in another world as substitute bodies if the original mummies should perish, there developed during the Middle Kingdom a custom of placing in the tombs elaborate groups representing in part people at their household duties, and partly the ceremonies conducted for the benefit of the dead. As food was fundamental, figures representing the making of bread and beer, and showing ovens and baskets of food, were prominent.

On the religious side, many of the models represented boats transporting the dead to the tomb of Osiris at Abydos, since all of this god's subjects wished to visit him in person or in proxy. Often the actual mummies were transported to this tomb.

ANCIENT DEITIES OF MEXICO

A collection of stone statues representing various deities of the ancient aboriginal inhabitants of Mexico has been placed on exhibition in the hall of Mexican and Central American archaeology (Hall 8). Curious sidelights on the religious beliefs of the Aztecs, Toltecs, and related peoples, are reflected in the symbolism of these carvings, some of which are crudely executed, and others of which are examples of a high degree of artistic skill.

Some of the gods represented were connected with especially revolting rites of human sacrifice. There is Huehueteotl, god of fire, to whom human victims were offered by throwing them into a furnace and, just before they expired, withdrawing them, cutting the breast open with a stone knife and removing the heart. Then there was Coatlicue ("Snake Skirt"), goddess of rain, whose human victims were decapitated or flayed, and then had their skins removed to be worn as garments by priests in a ritual of rain.

One head, hollowed out to hold liquids, represents one of the gods of the "four hundred kinds of drunkenness." Mr. J. Eric Thompson, former Assistant Curator of Central and South American Archaeology, says that the ancient Mexicans used the term "four hundred" in the same sense that we use the expression "a thousand and one" in making an off-hand statement. These aboriginals delighted in innumerable ways of becoming intoxicated, and they celebrated each method by placing it under the tutelage of a separate deity.

The goddesses of maize, and other agricultural deities such as those of other crops, of the fields, and of rain, were nearest to the hearts of the Mexicans. One of the statues represents the principal one of these, Chicomecoatl ("Seven Snakes"). The Mexicans, like many other American aboriginals, linked the serpent closely with the idea of rain. Also shown are stone frogs which likewise were symbols of rain. Other deities represented include Chalchiutlicue, Aztec goddess of running water and sister of Tlaloc the rain god, and Xochipilli, the fat squatting patron of music and flowers.

SPECIMENS OF RARE BUFFALO RECEIVED FROM PHILIPPINES

Field Museum has received a highly valued gift of four tamarao skins, presented by Mr. A. W. Exline of San Jose, Mindoro Island, in the Philippines. Mr. Exline is a friend of Colonel Theodore Roosevelt. While Colonel Roosevelt was Governor-General of the Philippine Islands he suggested to Mr. Exline the desirability of a group of tamarao for the Museum, and Mr. Exline kindly acted on this suggestion, hunted the animals, and the present gift has resulted.

The tamarao is a quite rare animal—a small species of buffalo found nowhere in the world except in the jungles of the island of Mindoro. It is much smaller than the common Asiatic water buffalo to which it is related, but is considered a dangerous animal to hunt. Its horns lie straight backwards above its head instead of flaring out like those of its Asiatic cousin. The tamarao is black and tan in color. The specimens received include a bull with horns measuring eighteen and three-quarters inches, which, according to available data, probably are the largest on record. The other three specimens are a young female, a young bull and a calf. Plans are being formed for the preparation of a habitat group with these specimens.

MUSEUM'S INSECT COLLECTION EXCEEDS 150,000 SPECIMENS

By William J. Gerhard
Associate Curator of Insects

Visitors to Field Museum are generally unaware of the fact that many of the extensive exhibits are supplemented by large series of specimens that serve as study or reference collections. These collections, which in number of species and specimens may exceed those on exhibition, are available for study or examination by students or those seeking information not supplied by the exhibits.

One of these reference collections comprises the insects, and their allies such as scorpions, centipedes and spiders. More than 150,000 specimens are contained in this collection. Most of them are pinned, labeled so as to indicate when and where they were collected, and arranged in glass-topped drawers in cabinets that protect them from destruction by living insect pests and the fading tendency of light.

"How are all of these specimens obtained?" is a common question. They are the gifts and purchases of single specimens or entire collections during a period of forty years, as well as the returns of numerous local field trips and the partial results of a number of expeditions to foreign countries.

The Museum's series of butterflies and moths, which exceed 75,000 in number, includes, in addition to many other acquisitions, the specimens of five acquired private collections. The largest and most valuable of these private collections consists of 50,000 butterflies and moths from various parts of the world. They represent the life work of the late Dr. Herman Strecker, who was a noted authority on this order of insects. Besides the 14,217 species and varieties in this collection, there are also 772 irreplaceable types, cotypes and paratypes of 443 species and varieties described as new to science by Strecker, Behr, Reakirt and others. Other private collections of butterflies and moths in the Museum's possession are those made by J. G. Sorup, A. J. Snyder, August Sala and George F. Curtis. Nearly all of the North American moths of the collection of the late O. C. Poling are also represented.

Among the Museum's 40,000 specimens of beetles, more than half of which are species found in the United States and Canada, are the private collections made by George P. Wells, E. B. Chope, R. W. Gilbert, Seth Lindahl and George F. Curtis.

In addition to the briefly enumerated private collections, the final disposition of which is worthy of record, there are likewise available for study thousands of specimens belonging to other orders of insects, like bees, wasps, bugs, grasshoppers and dragonflies.

EXHIBIT OF LOQUAT

The loquat or Japanese meddler is a small plum-like fruit which is beginning to appear sporadically in our markets. It is originally from eastern central China where it is still found in a semi-wild state. It has long been cultivated in Japan and in northern India where it is greatly esteemed for its agreeable, sweet-acid flavor.

The fruit is rather inconspicuous in appearance, being smooth, ovoid, pale yellow to orange in color, with a downy, tough skin. Its flesh is somewhat firm in texture but juicy, white with a tinge of buff or orange. A variable number of rather large seeds, usually five, is enclosed.

Branch of Loquat

Reproduction prepared in the laboratories of the Department of Botany and placed on exhibition in the Hall of Plant Life.

The loquat is produced by a small tree with a dense crown of foliage and clusters of pleasantly scented white flowers. There are many horticultural varieties, forty-six being enumerated from Japan.

Within recent years the loquat has been introduced into most of the subtropical and warm temperate regions of the world. It is now grown successfully in the Mediterranean countries, in Central and South America, and has been introduced into southern California.

A reproduction of a fruiting branch of the loquat tree has been added to the exhibit of the rose family in the Hall of Plant Life (Hall 29). —B.E.D.

The principal by-products of coal are exhibited in the Department of Geology.

GUIDE-LECTURE TOURS

During August the conducted tours of the exhibits under the guidance of staff lecturers will be given on a special schedule, as follows:

Mondays: 11 A.M., Halls Showing Plant Life; 3 P.M., General Tour.

Tuesdays: 11 A.M., Halls of Primitive and Civilized Peoples; 3 P.M., General Tour.

Wednesdays: 11 A.M., Animal Groups; 3 P.M., General Tour.

Thursdays: 11 A.M. and 3 P.M., General Tours.

Fridays: 11 A.M., Minerals and Prehistoric Exhibits; 3 P.M., General Tour.

There are no tours on Saturdays and Sundays.

Persons wishing to participate in the tours should apply at the North Entrance. The tours are free, and no gratuities are to be proffered. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Armstrong Cork Company—10 samples of cork and a photograph of cork oak; from Professor G. Eifrig—153 herbarium specimens, California; from James Zetek—17 herbarium specimens, Barro Colorado Island; from Rev. Brother Elias—70 herbarium specimens, Colombia; from Philadelphia Quartz Company—14 specimens silicate of soda and material from which it is made; from Roy Dubisch—a fox snake, Illinois; from F. J. W. Schmidt—a fox snake and a painted turtle, Wisconsin; from Henry Dybas—7 green snakes, Wisconsin; from A. W. Exline—4 tamarao skins and skulls, 4 crocodile skulls, and a gecko, Philippine Islands; from Chicago Zoological Society—3 study skins of birds; from Henry Field—75 ethnological objects, Iraq and Syria; from Ellery Walter (deceased)—9 ethnological objects, southeastern Asia.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from June 17 to July 9:

Associate Members

Dr. Edward A. Brucker, Harry L. Diehl, Joseph Regenstein.

Annual Members

Dr. Alfons R. Bacon, Mrs. R. J. Beatty, W. C. Buethe, Owen L. Coon, L. Thomas Kelley, Joseph H. Kirk, Dr. Alvin W. La Forge, Mrs. George D. McLaughlin, Mrs. J. W. Moore, George F. Pond, James E. Rowland, Hi Simons, Mrs. William Waller, Jr., Addison W. Warner, William J. White.

Double Refraction Illustrated

The phenomenon of double refraction of light is well illustrated in the exhibit of calcite in Hall 34 of the Department of Geology.

Calcite, because of its molecular structure, divides every ray of light into two rays. These are refracted or bent at different angles, so that images produced by the rays are separated. In the exhibit this is illustrated by a large calcite crystal on the back of which is a card containing some printed words in one line of type. Seen through the calcite these appear as two lines of type, thus illustrating the double refraction phenomenon.

Many minerals have this same property, but the divergence of the two rays is especially wide in calcite.

Dinosaur Bone

The bones of the great dinosaur in Ernest R. Graham Hall (Hall 38) appear to be converted wholly to chalcedony, but enough of the original bone persists so that when a splinter is burned in a gas flame, the offensive odor of burning bone can be detected.

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THE FOUR-TUSKED MASTODONS AND RIVER-RHINOCEROSES OF NORTH AMERICA

By Elmer S. Riggs
Associate Curator of Paleontology

Of all migrations to America of man or beast in historic or prehistoric times, the coming of the elephant family was one of the most far-reaching. The mastodon branch of the family came first, and long afterward the true elephants followed.

This movement affords unmistakable evidence that there must have been a land route of migration from Asia to North America. No other means could account for the coming of these great beasts which are entirely unknown in the earlier history of life on this continent. No waifs cast up by the sea, no victims of mischance drifting in on ice-floes or on natural log-rafts, could account for the transport of such substantial beasts. They came after trekking across Asia from their earlier African home—came in such numbers as to establish here permanent colonies which in time grew and spread over two American continents and gave rise to a stock of animals which became thoroughly established in the Western Hemisphere.

The accompanying illustration shows a pair of the four-tusked mastodons (*Trilophodon*) on the banks of a broad and shallow river near the close of the Miocene period, fifteen million years ago. It is a photograph of a painting by Mr. Charles R. Knight—one of the series of twenty-eight murals of prehistoric life exhibited in Ernest R. Graham Hall (Hall 38).

Mastodons such as *Trilophodon* stood six or seven feet in height at the shoulders and were armed with a rather short trunk and two pairs of tusks. The tusks were enlarged incisor teeth and had only a narrow band of enamel which extended throughout the greater part of their length. The upper tusks curved downward and met the lower pair, which were set in a long, curved lower jaw. This characteristic has given rise to the name "longirostrine" or long-jawed mastodons. In some related animals the lower tusks were broad and chisel-shaped and, fitting closely together, formed a shovel-like projection. These animals, recently discovered in America as well as in Mongolia, are known as the shovel-jawed mastodons. The head in all of these animals was longer than that of the elephant and the forehead was less sloping. The body was likewise longer in proportion.

Fossil remains of the Miocene mastodons are found in sandbars along old river channels and in wind-blown sands of Nebraska, Kansas, Texas and of the southwest generally. Specimens are exhibited in Field Museum; entire skeletons are preserved in museums of Nebraska and Colorado.

The great river-rhinoceros, *Teleoceras*, shown in the same illustration, has a very different history. It is descended from a long line of North American ancestors which date back to middle Eocene time, forty million years ago. This continent was the early home of the rhinoceros family although some members are also known from the Middle Eocene of Europe.

Their fossil remains are preserved more and more abundantly in each succeeding geological period from Eocene to Pliocene. Members of the family branched out, taking on new characteristics and adapting themselves to new habits. There had been among them a line of slender animals, evidently fleet-footed runners; there had been various more conservative lines whose members were fitted for life in forest lands; finally came the short-limbed, heavy-bodied animals which, like the hippopotamus of the Old World, were at home in the rivers and capable of slow and laborious progress on land. Such is the river-rhinoceros, *Teleoceras fossiger*. Specimens including the head, legs and feet of this animal are exhibited in Graham Hall.

Teleoceras, or the "true horned" beast, lived and has left his fossil remains in various old river channels of the Great Plains region along with those of the four-tusked mastodon, but more abundantly. A single sand-pit at Long Island, Kansas, excavated by many collectors during the later eighties and the early nineties has produced skulls and other parts of more than one hundred animals. Cornfields now grow over the site of this old river channel which had afforded them burial place.

Greater elevation of the continent and increasing cold of Pliocene time marked the disappearance of the entire rhinoceros family in North America. Not so with the mastodons. Whether hardier by nature or better adapted to upland life, it is certain that descendants of this line continued to live in North America through the rigorous period of the Ice Age, growing stronger and sturdier during this period of hardship, and sending wandering branches of the family over most of South America. Some of them survived there until well within the Christian era, although the main stock died out in the central states of North America a few thousand years ago.

Giants That Roamed America Ages Ago

The four-tusked mastodon *Trilophodon* (in the center), and the rhinoceros *Teleoceras* (on the left), which lived on the Great Plains of North America at the close of the Miocene period (about fifteen million years ago). From a mural painting by Mr. Charles R. Knight. The small animals at the right are oreodonts or contemporary pig-like animals.

Change in Visiting Hours

Field Museum visiting hours, which have been 9 A.M. to 6 P.M. daily during the summer months, will change to the autumn schedule—9 A.M. to 5 P.M.—on Tuesday, September 3, the day after Labor Day. These hours will continue until October 31. On November 1 the winter hours, 9 A.M. to 4:30 P.M., will go into effect, continuing until March 31. During this period, however, the Museum will be open until 5 P.M. on Sundays.

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

"LIVING FOSSILS"

The queer forms of life which inhabited the earth in prehistoric times are not quite all extinct. In the depths of the seas are to be found, alive, the last lingering remnants of great groups of fishes and their relatives, of the types that filled the oceans millions of years ago. An exhibit of these so-called "living fossils" is a feature of the collections of fishes in Albert W. Harris Hall (Hall 18).

Among the species of "living fossils" shown are various gars, lungfishes, and lampreys, the paddlefish "bowfin" or "dog-fish," and the bichir of the Nile.

Scientific study of the structure and life history of the lampreys—a kind of eel with a round sucking mouth and a skeleton of cartilage instead of bone—leads to the belief that they were among the world's first definitely fish-like creatures. The gars are the last representatives of the tribe of armor-plated fishes which once swam the seas in vast multitudes. Today they are the wolves of fresh water, being viciously destructive to other forms of aquatic life. In salt water, which they also inhabit, there are other creatures just as predatory. In comparatively recent times, geologically speaking (which means regarding hundreds of thousands and even millions of years ago as "recent"), the waters of the world were filled with fishes of various shapes and sizes, all carrying shell-like armor such as the gars wear today.

The lungfishes, shown in the exhibit, are believed to be direct descendants of fishes which were probably the ancestors, during the course of evolution through the ages, of all later and higher forms of life. They were the great, great, great (and great multiplied perhaps a billion times) grandfathers of, first, the amphibians, now represented by our frogs, toads and salamanders; then of the reptiles which definitely forsook the water for habitation on land; and from them of the birds, whose direct ancestors were reptiles; and finally of the mammals, also derived through the reptiles.

Of the paddlefishes, so-called because of their long paddle-like snouts, very little is known. They are found in various waters, notably in the Mississippi Valley, and are valuable for their roe which makes excellent caviar. Of their habits, and the use they make of their long snouts, scientists have to date been able to learn practically nothing. The Nile fish called bichir, shown in the exhibit, seems to be related to the ancestors of most of the higher vertebrates, but not closely to living forms.

EXHIBIT OF ANCIENT GLASS

The Museum's extensive exhibits of ancient glassware from Syria, Rome, Pompeii, Gaul, Mesopotamia and other centers of early civilization, have been improved and reinstalled in Edward E. and Emma B. Ayer Hall (Hall 2). Four large cases and part of another are devoted to this material. Many rare and unique specimens are included. The objects range in age from the first to the fifth century A.D.

That trade marks were employed in ancient times is indicated by the name of a manufacturer, "Froti," which appears in raised letters on the bottom of an oil bottle made in Gaul in the second century A.D. Many of the bottles and other vessels of various shapes were designed to hold cosmetics and perfumes, and are comparable to modern vanity equipment. Others were used for beverages, and some as amulets. Articles with Christian symbolical motifs as well as pagan art are included, among them decorative vases, jars, cups, flagons, pitchers and other vessels.

Glass was invented in Egypt, whence its manufacture spread to Syria. Two cities in the latter country, Sidon and Tyrus (Tyre), achieved a great reputation all over the ancient world for the quality of their glassware, which was traded to Asia Minor, Greece, Italy, Persia, China, and other countries. By the first century A.D. glassware was common in Italy, and glass drinking cups had superseded those of gold and silver. Glass factories were then established in Italy and in the Roman colonies in Spain, Gaul, Belgium, and the Rhineland. One of the chief attractions of ancient glass, as shown in the Museum's exhibit, is its iridescence, which is produced by chemical action under ground, exposure to dampness, and oxidation of metals used in producing colored glass. Nearly all technical processes of essential importance in glass manufacture were mastered in ancient times.

Oldest Pewter Piece

What is believed to be the oldest piece of pewter in existence is on exhibition in the Edward E. Ayer Pewter Collection in Hall 23. It is an inscribed tablet bearing in Chinese a date indicating the year A.D. 85. It was found in a tomb in Lo-yang, province of Honan, China. This pewter document is a relic of the Han dynasty, and is executed as a deed or grant of land for the burial place of the governor of Tung-kün, who was a great scholar highly esteemed by his contemporaries.

Preparator Abbott Dies

Mr. John B. Abbott, highly skilled preparator of fossil skeletons in the Division of Paleontology of the Department of Geology, died on August 6. Mr. Abbott, who was 61 years old when he died, had been employed at Field Museum since 1901, and, except for a few intervals on leave of absence, had worked here continuously since that time. He was a member of several Museum expeditions to the western United States, Canada and South America. A great number of the articulated skeletons and other specimens of fossil animals in Ernest R. Graham Hall were prepared for exhibition by him.

Death of F. J. W. Schmidt

With deep regret news has been received of the tragic death of Mr. F. J. W. Schmidt, and Mrs. George W. Schmidt, his mother, in a fire which destroyed a farmhouse belonging to the Schmidt family near Stanley, Wisconsin, on the night of August 7. Mr. Schmidt was mammalogist of the Leon Mandel Guatemala Expedition of Field Museum in 1933–34, and was a brother of Mr. Karl P. Schmidt, Assistant Curator of Reptiles, who was leader of the expedition. In recent years Mr. F. J. W. Schmidt had been employed in special work for the Wisconsin Conservation Commission and the Department of Game Management of the University of Wisconsin. He had specialized in the study of mammals and was an authority on those of his own state. In 1924–25–26 he was employed as a special assistant in the Division of Reptiles at Field Museum.

A large collection of highly artistic fans, made of peacock, goose and eagle feathers, of painted and gilded gauze, and of other materials, is an interesting feature of the Museum's Chinese exhibits.

RARE PLANT IS FOUND AT JOLIET, ILLINOIS

By Paul C. Standley
Associate Curator of the Herbarium

Several of the rarest plants of the world grow in the Chicago region. Because of their limited and curious distribution they are of great interest to botanists.

In June the writer, with Dr. Charles Baehni of the Botanic Garden of Geneva, Switzerland, through the courtesy of Mr. H. Forrer, visited Joliet to see one of these rare plants, whose Latin name is *Actinea herbacea*. A member of the sunflower family, it is a low tufted perennial, with a dense cluster of silky, silvery leaves, from which rise short stems, each with a single golden-yellow flower head. It is a handsome and decorative plant, well worthy of cultivation, although it is rather improbable that it would thrive in an ordinary garden.

The party was successful in finding the plant still in blossom, although most of the clumps had passed the flowering stage. It is rather plentiful on the low glacial moraines near Joliet, growing among rocks where there is little soil.

This rare plant has been found in but one other locality, near Sandusky, Ohio, where it is called "lakeside daisy." Its interest lies in the fact that the other Actineas, which are rather numerous, all grow on the prairies of the Great Plains, on the hills and plains of the Rocky Mountains and the Great Basin, or along the western coast of South America. How this isolated one happens to inhabit the Mississippi Valley is one of the mysteries of plant distribution.

IMPORTANT BIRD COLLECTION ACQUIRED BY MUSEUM

A significant addition to Field Museum's study collection of birds has recently been made through the acquisition of part of the Henry K. Coale Collection. This addition to the Museum's already notable research material consists of approximately 2,500 specimens representing more than 1,000 species. It is especially rich in Old World birds, and includes about 200 species from Madagascar, Asia and Australia which hitherto were unrepresented in the collections of this institution.

The late Henry Kelso Coale of Highland Park, Illinois, assembled three important collections during more than fifty years. The first was acquired by the British Museum in 1880. The second came to Field Museum early in 1900. The last, a truly representative world-wide collection, was built up by purchase and exchange of Illinois specimens for exotic birds with collectors in foreign countries.

At his death in 1926, Mr. Coale's collection numbered about 11,000 specimens. Half of them were American birds and have been dispersed to many collections throughout the country. The remainder has been divided by Field Museum and the University of Michigan, the latter taking the birds of the New World. Field Museum's share was purchased through the Emily Crane Chadbourne Fund. —R.B.

Meteorology and Meteoritics

The meteorites of the meteorite collection have no relation to meteorology, the weather science. The two names are similar because they are both derived from the same Greek word which means phenomena of the upper atmosphere. Meteorology, the weather science, is largely based on such atmospheric phenomena as winds and rains, and meteors become luminous in the upper air. The science of meteorites is called meteoritics.

THE STRANGE NESTING HABITS OF RHINOCEROS HORNBILL

An example of successful companionate marriage among the birds is found in the life of the rhinoceros hornbill. This large and peculiar bird, which has a grotesque sort of beauty, is native to the Malay Peninsula, Borneo, and Sumatra.

The extraordinary nesting habits of this bird are illustrated in an exhibit in the systematic bird series in Hall 21. After pairing, the hornbills select a hollow tree which the female enters. Then, with the assistance of the male, who remains outside, the female walls up the entrance with mud and other materials until only a small slit is left open through which she can thrust her long narrow bill. During the entire

Rhinoceros Hornbill

Exhibit in Hall 21 showing male bird on outside of hollow tree in which his mate has been sealed during nesting period. Her bill can be seen protruding through hole in trunk.

period of laying and incubating the eggs, and the growth of the young to the flying age, the female remains imprisoned in the trunk. The male, free on the outside to do as he pleases, remains nevertheless faithful to his mate, returning frequently with food which he deposits in her bill through the slot in the tree, and otherwise assiduously attending to her needs.

This peculiar habit is undoubtedly resorted to as a protection for the eggs and young from the marauding squirrels and monkeys which abound in the tropical forests. The Museum's exhibit of the rhinoceros hornbill shows the male characteristically perched on the outside of a hollow tree trunk, and the bill of his mate protruding through the slit from the inside, preparatory to receiving food.

The rhinoceros hornbill is so-called because it has a large hornlike casque above its bill which gives its head a resemblance to that of a rhinoceros. Specimens of other hornbills with the same general characteristics, but differing in size, color and shape of the horn, are also on exhibition. Among them are species from Asia, Africa, the Philippines, and New Guinea.

EGYPTIANS' MORAL CODE REVEALED BY PAPYRUS

A good key to the standards of morality existing in ancient Egypt is found in the pleas to the gods contained in a "book of the dead" belonging to a lady named Isty who lived about 1000 B.C. This funeral papyrus is one of a collection on exhibition in Hall J at Field Museum. Dr. T. George Allen, Assistant Curator of Egyptian Archaeology, deciphered it. It describes Isty as "the housemistress, the chantress of Amon."

That the moral ideals of the Egyptians were similar to those of Christianity is revealed in the denials of sins made by Isty in her manuscript, which is about eight feet long, and about half of which is devoted to these denials. The papyrus depicts forty-one divine judges, to each of whom is addressed one denial of a specific sin. Most of these sins would classify as such under the Christian code. Isty denies, among other things, that she has been guilty of murder, stealing, uttering falsehoods, sacrilege, wrathfulness, cruelty, adultery, violence, rebellion, extravagance, plundering, lust, blasphemy, uncleanliness, nagging, quarrelsomeness, causing sorrow, or hasty judgment. Even the Christian idea of "turning the other cheek" and forgiveness seems to have been anticipated, as one of Isty's pleas reads, "I have not harmed an evil-doer."

The papyrus is accompanied in the exhibit by a line-by-line translation and explanation of the hieroglyphics. Isty's burial was found in a great cache at Deir el-Bahri, part of the cemetery of Thebes, which was uncovered by archaeologists in 1891. The burial document was presented to the Museum by the late Martin A. Ryerson. It is half in colored vignettes, and half in hieroglyphics. Pictures represent incidents connected with the death and posthumous adventures of Isty among the magical powers of the land of the dead. The sacred phoenix, and the gods Nut, Osiris and other deities appear. The papyrus ends with a spell supposed to enable the deceased to join Re, the sun-god, in his daily journeys across the sky.

NEGRO CULTURE IN GUIANA

Eight objects from Dutch Guiana, South America, recently presented to the Museum by Mr. and Mrs. Maurice Berkson, of Highland Park, Illinois, are of especial interest because they show the survival of Negro crafts that have persisted in the West Indies and Guiana since the importation of slaves from West Africa several centuries ago.

Research has indicated that much of the culture of West Africa—for instance folklore, magical practices, religious beliefs, and artistic designs—has survived despite a foreign and hostile environment. This observation is confirmed by inspecting the wood carvings from Mr. and Mrs. Berkson.

Included are a barrel-shaped drum with a pegged membrane, and a stool which has a decorative design in the form of a figure eight, both of which are characteristic of West African art. A stirrer and spoon carved from one piece of wood and fastened together by four wooden links could be matched not only in West Africa but as far south as Zululand. An excellent wooden hair comb is typical of those worn by Negroes of West and Central Africa.

These objects provide an impressive example of the vitality of a culture even when the roots of that culture are torn from their native soil. —W.D.H.

STRANGE AUSTRALIAN MAMMALS

Australia is the land of some of the queerest animals on earth. One of the most interesting zoological exhibits in the Museum is the collection of strange Australian mammals in Hall 15. Among these is the answer to the old zoological conundrum, "What is it that has a bill like a duck, webbed feet like a duck, lays eggs like a duck, and yet is not a duck?" It is a platypus, a furry amphibian mammal of which the Museum has several specimens.

Other odd creatures on display from this zoological Alice's wonderland are the echidna, a sort of combination porcupine and ant-eater, which also lays eggs; the spotted dasyure, a cat-like animal which, however, is no relative of the true cat family; the Tasmanian devil which preys upon sheep; the banded marsupial anteater; the flying phalangers which resemble both squirrels and opossums; the rabbit bandicoot; and various types of the more familiar but none the less queer kangaroo. Of special interest is the koala, a curious tailless marsupial with tufted ears and a comical expression on its face, which looks almost exactly like a toy teddy bear and may have been the inspiration for that popular plaything. All of these animals are distinctly peculiar to Australia. The platypus and the echidna are the only extant mammals that lay eggs, and are the most primitive of mammals, coming closest in appearance, habits and development to creatures of prehistoric days. In fact, these two mammals have many structural resemblances to reptiles.

In no other land are there found so many marsupials (animals which carry their newly-born young in a fur-lined pouch) as there are in Australia. Zoologically, Australia is a world apart from the rest of the earth. Practically all its mammals are marsupials, whereas this primitive order is scarcely represented elsewhere except by various opossums in the Americas. The reason for the evolution of Australia's animals taking a different course from that of animals in other parts of the world probably lies in the fact that for millions of years that continent was completely isolated. Thus without any competition from invading forms the Australian animals have developed along their own unique lines.

MANY USES OF PEPPER

A poison for killing rats, a narcotic to be placed in water to drug fish, thus making them easy to catch, a highly intoxicating drink, a local anaesthetic used in the crude surgery practised by primitive peoples, a wrapper for the betel nut pulp which is the chewing tobacco of many tribes in tropical countries, and ointments, cubebs, and other medicinal materials—these are all products of pepper plants, usually thought of mainly as the source only of a seasoning for foods.

An exhibit showing a pepper vine as it appears in life, and a collection of some important pepper products, constitute one of the features of the Hall of Plant Life (Hall 29). Much of the material in the exhibit was collected by the Marshall Field Brazilian Expedition.

There are approximately 1,300 species of peppers in the world. About one-half of these are indigenous to South America; the rest to the Old World, particularly the Oriental tropics. The American green and red peppers, so-called, are not members of the true pepper family at all, but belong to the potato family.

The same species of pepper plant is the source of both the common black and white peppers in general table use, the white pepper being made from the same berries as the black but with the husks removed before grinding.

The favorite intoxicating beverage of the natives of Polynesia is a pungent sort of grog made from the root of the kawa, a variety of pepper. This they often drink until they fall unconscious. Another variety of pepper, called "cuhé," is used by aboriginal people in Peru to poison rats, and to stupefy fish. The Javanese and other betel nut chewing peoples wrap the nut in the green leaves of a pepper vine. Cubebs, used in cigarettes made for people with respiratory ailments, is a pepper plant product from the East Indies. Indians of the west coast of America have found a similar pepper plant useful in their native medicines.

Prices Cut on Picture Portfolios

The portfolio *Taxidermy and Sculpture—The Work of Carl E. Akeley in Field Museum of Natural History*, containing 47 large photogravures of Akeley's well-known work, is now on sale at the Museum at 25 cents a copy. This is a drastic reduction in price, as it was originally published several years ago at $2.00 a copy. Likewise, another attractive picture portfolio, *Abyssinian Birds and Mammals, from Paintings by Louis Agassiz Fuertes*, originally priced at $3.00, is now available at $1.00. It contains 32 colored reproductions of paintings by the man who before his death was probably America's foremost bird artist. On mail orders the cost of postage must be added to the above prices; this varies according to destination and may be learned by inquiry to the Museum. Within the city limits of Chicago postage is 9 cents.

Rainbow Agate

In iris or rainbow agate the various bands or layers of differing color or translucency which characterize all agate are so minute and so closely spaced that they diffract light passing through and produce a play of rainbow colors. These colors appear only in transmitted light and when the agate is held in the proper position relative to the eye. Under other conditions the iris stone has the appearance of ordinary agate so that the rainbow effect can seldom be seen in specimens in museum cases. There are several specimens of iris agate in the gem collection in H. N. Higinbotham Hall (Hall 31).

Museum Men at Botanical Congress

Professor Samuel J. Record of Yale University School of Forestry, who is Research Associate in Wood Technology for Field Museum, and Mr. Llewelyn Williams, Assistant Curator of Economic Botany at the Museum, are in Europe to attend the International Botanical Congress which is to be held this month at Amsterdam.

Amber from Redwood

A fine piece of amber from Manchukuo, recently placed on exhibition in Hall 34, is fossilized resin of an ancient redwood tree. Most of the amber in use is the fossil gum of a variety of pine. The amber from Manchukuo is found in the Fushun coal mines, where nearly 8,000 tons are mined with the coal every year, although only a very small part of it can be recovered.

SEPTEMBER GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for September:

Week beginning September 2: Monday—Labor Day holiday, *no tour*; Tuesday—General Tour; Wednesday—Primitive Peoples; Thursday—General Tour; Friday—Habitat Groups.

Week beginning September 9: Monday—Egyptian Hall; Tuesday—General Tour; Wednesday—Races of Mankind; Thursday—General Tour; Friday—Plants of Economic Value.

Week beginning September 16: Monday—Crystals and Their Uses; Tuesday—General Tour; Wednesday—China and Tibet; Thursday—General Tour; Friday—Deer and Antelopes.

Week beginning September 23: Monday—Hall of Plant Life; Tuesday—General Tour; Wednesday—Mexico; Thursday—General Tour; Friday—Fish and Reptiles.

Monday, September 30—Geology Exhibits.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in FIELD MUSEUM NEWS. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Mr. and Mrs. Maurice Berkson—8 ethnological specimens of the Djukas, Dutch Guiana; from Potlatch Forests, Inc.—a log section and a wheel section of Idaho white pine, Idaho; from Dr. C. A. Purpus—65 herbarium specimens, Mexico; from Iraq Petroleum Company, Ltd.—102 herbarium specimens, Iraq; from Professor A. O. Garrett—30 herbarium specimens, Utah; from Mrs. R. K. Smith—82 herbarium specimens, Korea; from Dr. Earl E. Sherff—176 herbarium specimens, Hawaii; from A. E. Lawrance—20 herbarium specimens, Colombia; from Mrs. Ynes Mexia—64 herbarium specimens, Brazil; from Dr. Hazel Schmoll—15 herbarium specimens, Colorado; from A. H. Sullivan—a fossil fish; from James Quinn—a specimen of diatomite, Nebraska; from Stanley Field—a specimen of glauconite, New Jersey; from C. D. Woodhouse—a specimen of augelite and a specimen of dumortierite, California and Nevada; from Gordon Pearsall—3 hoary bats, Illinois; from Dr. A. Bechara—a night heron, a snipe, and a sandpiper, Syria; from P. R. J. Cazaly—a lizard, Iraq; from Dr. Y. S. Shuwayhat—10 scorpions and 6 snakes, Palestine; from Dr. P. S. Manasseh—a snake, Iraq; from Walter A. Weber—a Texas fence lizard; from H. C. Hanson—a juvenile painted turtle, Illinois; from R. S. Sturgis—a plains garter snake, Illinois; from Edward Schaack—a vesper rat and a mouse opossum, Honduras; from J. T. Carpey—2 alligator lizards, a black-tailed rattlesnake, and a green rattlesnake, Texas; from Leslie Wheeler—5 eagles, 4 hawks, 2 owls, 35 birds of prey and 142 miscellaneous small birds, India and West Africa; from Wallace Craig—original records and natural history notes of James Oregon Dunn, 1887–1907; from Chicago Zoological Society—a gaboon viper skeleton, a side-necked turtle, and a mullet skink, Africa and Australia; from Marlin R. Perkins—13 snakes, Brazil and Arkansas; from Henry Dybas—a common water snake; from C. C. Liu—3 bats, China.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from July 10 to August 15:

Associate Members

Samuel N. Lebold, Fred A. Pettersen, Leslie M. Wheeler.

Annual Members

J. W. Embree, Jr., James H. Harper, Mrs. Louis A. Hebert, Thomas J. Leary, Frank D. Mayer, Harry S. McCracken, Dr. Henry C. A. Mead, Mrs. Julian J. Rankin.

Very complete Chinese vanity boxes, fitted with mirrors, and containing compartments for face powder, rouge, powder puffs, hairpins, combs, brushes, and other toilet articles, are exhibited in George T. and Frances Gaylord Smith Hall (Hall 24).

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RARE HIMALAYAN SNOW LEOPARDS, MOST BEAUTIFUL OF CATS, IN NEW GROUP

By Wilfred H. Osgood
Curator, Department of Zoology

With the recent installation of a group of snow leopards, the central section of William V. Kelley Hall (Hall 17) is completed. This section, which is devoted to carnivorous mammals of medium size, includes three other groups, the giant panda, the sloth bear, and the common leopard. The snow leopard group is of exceptional beauty and interest not only because of the charming qualities of the animal itself, but also on account of the stupendous grandeur of the scene in which it is displayed.

Most beautiful and least known of all the larger cats, the snow leopard inhabits the "roof of the world" in the vast mountainous area of central Asia. The high Himalayas, the Tibetan plateau, the Altai, and other high ranges are its only habitat, and it rarely descends below an altitude of 9,000 feet. In India it is found on the south side of the Himalayas, but it is more common on the Tibetan side. Another name for it is "ounce," probably derived from an old French word originally applied to the lynx and later transferred to this animal, perhaps via Persia where it was once erroneously thought to occur. It is sometimes also called by the name "mountain panther."

Snow Leopards in Their Timberline Habitat

New group in William V. Kelley Hall of the rare large cats sometimes known by the name "ounce." Mounted by Staff Taxidermist C. J. Albrecht. Background by Staff Artist Charles A. Corwin.

Within its range it is perhaps not especially rare, but the region is one so difficult of access that the animal is very little known except through native sources. It is so shy and elusive that hunters rarely get even a fleeting glimpse of it. If one is shot by a white man, it is usually by accidental encounter when seeking other game. American sportsmen who have hunted in the Himalayas have occasionally seen its tracks and have expressed the opinion that it might be successfully brought to bay by the use of well-trained hounds. However, the very high altitude and the rough terrain make it unlikely that the hunters could follow the dogs very far on horseback, so it probably remains a tempting exploit for some ambitious adventurer with confidence in the powers of his own lungs and legs.

The vicinity of timberline in the Himalayas, although forbidding to man except in the short summer season, is by no means devoid of life. The snow leopard, being the principal predaceous animal of the region, probably finds living not so hard as might be expected. It preys on the various species of wild goats and sheep, including the tahr, markhor, ibex, and the famous Marco Polo's sheep. Birds doubtless take a large place in its menu, and of these none could be more toothsome than the large handsome pheasants, such as the moonals or impeyans, the tragopans or horned pheasants, the blood pheasants, and the rare snow cock, all of which are partial to the highlands. In winter it descends, at times, far enough to encounter human habitations and then it raids the barnyard and pasture, carrying off poultry, sheep and other domestic animals.

Owing to its spotted markings and its similar size, the snow leopard is often thought to be only a light-colored and long-haired mountain variety of the common leopard. This, however, is not the case, for it is a very distinct species with many characters quite its own. Its thick, soft pelage, its long slender form and, above all, its unusually long and heavily-furred tail, combined with the delicate color and markings of its coat make it one of the most beautiful of living mammals. Its muzzle is rather short and the forehead high in conformity with the structure of the skull, which is somewhat different from that of other cats. As in the lion, tiger, jaguar, and leopard, the bones in its throat, at the base of the tongue, are constructed so as to preclude the act of purring. Therefore, in a primary division of the cat family, its place would be with these large forms to which the generic name *Panthera* has been applied, leaving for most of the smaller cats the older and better known term *Felis*, which is typified by the common house cat. In a still more refined classification it would be removed as unique under its own generic name *Uncia*, based mainly on the peculiar shape of its skull.

Skins of snow leopards are regularly sent in small numbers to the fur markets where they command a fairly high price for use as rugs, coats, and trimmings. Since they cannot be supplied in large numbers, they are independent of fashion and not well known. Natives, scattered over a wide area, who doubtless capture them by trapping one or two in a season, are the only source of supply. The skins in the Museum's group are of this sort, obtained through traders in northern India. The animals shown are an old female and two half-grown kittens. The old cat sits on a fallen log with a freshly-killed tragopan pheasant lying before her, while the kittens approach expectantly in anticipation of the play that precedes the meal. A few stalwart timberline trees stand near-by, and beyond is the magnificent front of the Himalayas swathed in their eternal snows reaching down to banks of morning clouds which fill the deeper canyons.

The group was prepared by Staff Taxidermist C. J. Albrecht, with painted background by Staff Artist Charles A. Corwin.

AIR PURIFIER INSTALLED FOR SIMPSON THEATRE

To increase the comfort of audiences attending lectures, children's programs, and other affairs held in the James Simpson Theatre of Field Museum, an "ozonator" or air purifying machine has been installed. This apparatus keeps the air fresh and pleasant without causing chilliness or drafts. Tests made show that with the ozonator in operation the air in the entire auditorium can be cleared in a very few minutes, and all chance of accumulation of impurities in the air is eliminated.

An exhibit in the mineralogical section of the Department of Geology illustrates the remarkable range of colors and forms of quartz.

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

FIELD MUSEUM NEWS

Stephen C. Simms, *Director of the Museum*.....*Editor*

CONTRIBUTING EDITORS

Paul S. Martin.....*Acting Curator of Anthropology*
B. E. Dahlgren.....*Curator of Botany*
Henry W. Nichols.....*Curator of Geology*
Wilfred H. Osgood.....*Curator of Zoology*
H. B. Harte.....*Managing Editor*

Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

NARWHAL SPECIMENS RECEIVED FROM CAPTAIN BARTLETT

Three specimens of narwhal, strange Arctic sea mammal, obtained by Captain Robert A. Bartlett, famous veteran explorer of the far north, were received last month at Field Museum. Captain Bartlett collected the animals from his schooner *Effie Morrissey* while conducting his most recent expedition on the west coast of Greenland during the past few months. Funds provided by Mrs. Emily Crane Chadbourne had enabled Field Museum to commission Captain Bartlett to collect the narwhals.

Included in the shipment is a male with a body about nine feet long, and a tusk about four feet in length; a female about twelve feet long, and a young narwhal. The specimens will be prepared at the museum for use in a proposed new group to be installed in the Hall of Marine Mammals (Hall N).

Narwhals are whale-like creatures, and belong to the dolphin family. They form one of the most peculiar species of animal in the order of cetaceans, which includes whales, porpoises, and other large ocean mammals. Male narwhals have a unique development of one front tooth which grows sometimes to almost half the length of the entire animal, forming a cylindrical spear-like tusk projecting horizontally from the head. This tusk, which is about two to three inches in diameter at the base, and a much smaller tooth also lying horizontally, are the only dental equipment the narwhal has. The tusk is ivory of a high quality but because it is so twisted it has little commercial use. The female narwhals are practically toothless.

Little is known of the narwhal's life, and the function of the long tusk is particularly a mystery, states Dr. Wilfred H. Osgood, Curator of the Department of Zoology. Apparently the animals are not dangerous, and not prone to use their tusks for attack in the manner of the swordfish. Narwhals are found almost exclusively in the Arctic regions, and it is difficult to obtain specimens of them, although they travel in schools like porpoises. They are a mottled gray in color, and attractive in appearance.

Captain Bartlett, one of the most experienced of Arctic sailors, has made many voyages to various parts of the Arctic. He was shipmaster for Robert E. Peary on two expeditions including the one on which the North Pole was reached. On November 30 he will appear as a lecturer at Field Museum, to give an account, illustrated on the screen, of his forty adventurous years in icy seas.

FOUR MORE ANIMAL BOOKS PUBLISHED FOR CHILDREN

Four new books for children, designed to bring authentic pictures and stories about animals into the homes and schools, were issued last month by the Orthovis Company of Chicago, with the cooperation of Field Museum. These small books are illustrated with "three-dimensional" pictures of habitat groups of mammals exhibited in the Museum, a development considered important in the advancement of visual education.

Each book contains several pictures of museum groups with scenic backgrounds, printed by the "Orthovis" process which makes the illustrations stand out from the page and appear to be in three dimensions like the groups they depict, when they are viewed through the "ortho-scope," an optical device which accompanies each copy. Titles of the books are *Giants of the Animal Kingdom, Strange Animals, Monkeys and Apes*, and *Wild Oxen*. They are published in "The Footprint Series" which includes also four previous titles issued a year ago—*The Lion, The Bear, The Deer*, and *Wild Sheep and Goats*.

The page borders contain sketches of the footprints of the various animals, and silhouette drawings showing them in characteristic actions. The text of the books is by H. B. Harte of the Field Museum staff, and has been prepared in a style suitable for children from about eight to fourteen years of age.

The publishers report that these books are being widely taken up as supplementary reading in schools, and in a number of states have been placed on the official lists of such material recommended to principals and teachers. In order to assist teachers in making the best use of them, two manuals for teachers, illustrating various ways in which the books can be adapted to schoolroom use, have been issued. This plan of "bringing the museum into the schools" has evoked much favorable comment in educational circles, the publishers state.

The books are obtainable at Field Museum at 25 cents each, plus postage. The teachers' manuals are sold at 10 cents each.

Gift of Hevea Specimens

Dr. Adolpho Ducke, veteran explorer of the Amazon forests, who has described many hundreds of new trees from that region, has presented to Field Museum an important series of plants of his collection. The material illustrates chiefly the variations of the *Hevea* trees of the Amazon valley, which produce most of the rubber of commerce. Dr. Ducke's sending includes also specimens of some of the new species that he has described recently in other families of plants.

SPECIAL NOTICE

All Members of Field Museum who have changed their residences or are planning to do so are earnestly urged to notify the Museum at once of their new addresses, so that copies of Field Museum News and all other communications from the Museum may reach them promptly.

Native Copper Boulder

A boulder of native copper recently presented by Mr. Frank L. Thomas, of Bremen, Indiana, has been added to the collection of glaciated copper boulders in Clarence Buckingham Hall (Hall 35). This boulder was found in the glacial drift of Marshall County, Indiana, and is noteworthy for the long distance it has traveled. It was picked up from the native copper deposit at Keweenaw Point on Lake Superior by an advancing ice sheet of the glacial period and transported over four hundred miles to Indiana where it was left by the melting ice.

Chinese Household Objects

The ancient Chinese had little furniture, and squatted on the ground as the Japanese still do. Mats were also used for sleeping. During the first centuries of our era, tables, chairs, and wooden bedsteads were gradually introduced. Examples of Chinese household objects are exhibited in George T. and Frances Gaylord Smith Hall (Hall 24).

The plants of the yam family are represented in the Hall of Plant Life (Hall 29) by an exhibit including specimens of the vines as they appear in life, and of tubers of the various species from Florida, West Virginia, Java, Trinidad and elsewhere.

DIORAMA OF BRAZILIAN COFFEE PLANTATION IS EXHIBITED

By B. E. Dahlgren
Curator, Department of Botany

Coffee has long been represented in the exhibits of Field Museum by samples of coffee beans from various parts of the world, by reproductions of fruiting and flowering branches of Arabian and Liberian coffee trees, and by photographs of the growing and preparation of coffee in various countries.

A recent addition to the coffee exhibits is a diorama presenting on a small scale a view of a coffee plantation of a type existing in large numbers in the state of Sao Paulo, Brazil, where more coffee is grown than anywhere else in the world.

Almost three-quarters of the world's annual coffee crop is produced in Brazil. Nearly all the rest comes from Colombia, Guatemala, Costa Rica, El Salvador, Nicaragua, Mexico, Haiti, Puerto Rico, and a few other countries of Central and South America and the West Indies, leaving only a very small part of the coffee industry to the Old World tropics. This may seem remarkable in view of the Old World origin of the plant, but may be explained by the fact that the introduction and growth in popularity of coffee occurred at the time of the settlement and opening in the western hemisphere of large areas possessing favorable conditions of soil and climate for its cultivation. Cheap slave labor on the New World plantations, and the almost total destruction by a leaf-blight of the British and Dutch plantations in the eastern tropics were other factors of importance favoring the development of coffee-growing in the New World. More than two billion coffee trees are said now to be in bearing in tropical America, and with ample areas still existing for extension, coffee production is limited only by demand.

Coffee Plantation In Miniature

This model of a large Brazilian plantation has been placed on exhibition in Hall 25. It is the work of Preparator John R. Millar of the staff of the Department of Botany. Background by Staff Artist Charles A. Corwin.

As to the early history of coffee as a beverage, little or nothing is known beyond the tangle of fable and fiction constituting the story of its introduction into the southwestern corner of Arabia where it was grown in the highlands of Yemen on the Red Sea perhaps as early as a thousand years ago. The practise of roasting the bean is said to have originated in Persia, but even this is doubtful. Its use first became general early in the sixteenth century, in the cities of the Levantine seaboard, especially Constantinople, whence within a hundred years it spread to the rest of Europe.

All of the early supply came from Arabia or through the Arabians. The Dutch, wishing to make themselves independent of this source of supply carried seeds or plants to Ceylon, where they soon flourished. From there plants were taken to greenhouses in Amsterdam and thence sent to Paris. From Paris coffee plants were brought to Martinique in 1723. That island thereafter furnished plants for other West Indian islands and for various parts of the tropical American mainland. The Dutch had by this time also introduced coffee directly into Surinam.

The commonly cultivated, so-called Arabian, coffee tree is of African, particularly Abyssinian origin. The word "coffee" is derived from "Kahfeh," the name of an Abyssinian city and kingdom now part of the Ethiopian empire.

The genus *Coffea* to which coffee belongs includes about thirty species of bushes or small trees of the Old World tropics, of which eighteen are west African, six of southeast Africa and African islands, four of southern Asia, India, Bengal and the East Indies, and one native to New Guinea. Although many of these may be potential sources of coffee beans, and actual crops have been produced from some east African species, the only one besides the so-called Arabian coffee that has come to be of any economic importance is the Liberian, a lowland coffee planted somewhat extensively in western Africa. It thrives at a lower elevation than the Arabian coffee and produces a larger bean.

The practical importance of Arabia as a coffee producer came to an end long ago. The term "Mocha" now applies generally to a certain form and small size of coffee bean, regardless of place of production.

In the foreground of the diorama in Hall 25 may be seen the drying field, a tiled or cemented area on which the crop is prepared for the market. In some places the coffee berries as gathered from the trees are allowed to dry and the seeds or "beans" to shrink before being freed from the husk, usually by some kind of mechanical device or machine. The modern method is to pass the berries as soon as picked through a hulling machine which removes most of the pulp from the green kernels or seeds. This is followed by maceration in water and washing, with some subsequent fermentation to destroy any remaining fragments, leaving only the parchment or silver skin to be removed mechanically after drying. Some countries export their coffee "in parchment" which is then removed only at the port of destination. This is done to preserve the coffee from contamination by odors to which it may be exposed. It may aid also, perhaps, to increase its keeping qualities, but those are in any case excellent, for unroasted coffee beans are said to improve with age and to keep very well for many years.

AUTUMN LECTURE COURSE COMMENCES OCTOBER 5

The Sixty-fourth Free Lecture Course to be presented by Field Museum will open on October 5. There will be nine lectures on science and travel, illustrated with motion pictures and stereopticon slides. These will be given on Saturday afternoons through October and November. All the lectures begin at 3 o'clock, and will be given in the James Simpson Theatre of the Museum. Well-known explorers and naturalists have been engaged for the series.

Of special timely interest will be the lecture on October 19, when Dr. Wilfred H. Osgood, Curator of the Department of Zoology, who was leader of the Field Museum–*Chicago Daily News* Ethiopian Expedition, will speak on "The Ethiopians and Their Stronghold."

The complete schedule of dates, subjects and lecturers follows:

October 5—Animals of the Rocky Mountains
Dr. Wendell Chapman, Berkeley, California

October 12—Our Fascinating Southwest
Major James C. Sawders, Nutley, New Jersey

October 19—The Ethiopians and Their Stronghold
Dr. Wilfred H. Osgood, Curator, Department of Zoology, Field Museum; Leader of the Field Museum—*Chicago Daily News* Ethiopian Expedition

October 26—From Egypt to the Cape of Good Hope
Captain Carl von Hoffman, New York City

November 2—The Second Byrd Antarctic Expedition
Dr. Thomas C. Poulter, Mount Pleasant, Iowa; Second-in-Command of the Expedition

November 9—Africa in South America
Hendrik de Leeuw, New York City

November 16—Tibet—Forbidden Land of Magic and Mystery
Harrison Forman, New York City

November 23—Plants Without Soil and Other Miracles in Nature
Arthur C. Pillsbury, Berkeley, California

November 30—Sails Over Ice
Captain Robert A. Bartlett, New York City

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats on request. Requests for these seats may be made by telephone or in writing to the Museum, in advance of the lecture, and seats will then be held in the Member's name until 3 o'clock on the day of the lecture. Members may obtain seats in the reserved section also by presentation of their *membership cards* to the Theatre attendant before 3 o'clock on the lecture day, even though no advance reservation has been made. All reserved seats not claimed by 3 o'clock will be opened to the general public.

RAYMOND FOUNDATION OFFERS PROGRAMS FOR CHILDREN

The James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures will present its autumn series of free motion picture programs for children beginning on October 5. Nine programs, on which will be presented a total of thirty-four motion pictures, will be given on Saturday mornings throughout October and November. There will be two showings of the films on each program, one commencing at 10 A.M. and one at 11. All will be presented in the James Simpson Theatre of the Museum. Children from all parts of Chicago and suburbs are invited to attend. They may come alone, in groups from schools and other centers, or with teachers, parents, or other adults.

The titles of the films to be shown on each date will be found in the following schedule:

October 5—Adventures of Wrongstart, the Dog: The Mountain Goats; The Bear Family; Wrongstart Meets a Porcupine; Shooting the Rapids.

October 12—Feeding the Fisheaters; Columbus Crosses the Atlantic.

October 19—'Neath Poland's Harvest Skies; The Dainty Hummingbird; Mammals in Strange Form; Old Man Trouble.

October 26—Among the Igloo Dwellers; Winter in an Arctic Village; Odd Hoofed Animals; Elephants at Work and Play.

November 2—Jungle Giants; The Veldt; The Wrestling Swordfish; The Prowlers.

November 9—The Jenolan Caves; The Declaration of Independence.

November 16—Winners of the West: The Departure of the Covered Wagons; Indians at Home; Buffalo Bill; The Pony Express; Within the Stockade.

November 23—Mt. Vesuvius and Its Neighbors; Small Cats and Monkeys; Glimpses of Rome; Turtles of All Lands; Kangaroos.

November 30—The Lapps and Their Reindeer; Wearers of Fur and Quills; Prehistoric Lake Dwellers; Falling Snow.

TYPES OF RACES TO BE PICTURED IN FIELD MUSEUM NEWS

The Races of Mankind sculptures by Malvina Hoffman, exhibited in Chauncey Keep Memorial Hall (Hall 3), have aroused such great interest that it is planned to publish a series of reproductions of them in FIELD MUSEUM NEWS. Of the 91 figures, groups, busts and heads in Chauncey Keep Hall, six were shown in illustrations printed in the June, 1933, issue of the NEWS, and five more appeared in the November, 1934, issue. Others will now be published from time to time, making it possible for interested readers to assemble a representative collection of these pictures.

Where Races of Mankind May be Studied

View of a section of Chauncey Keep Memorial Hall in which are exhibited the noteworthy racial portraitures in bronze and atone by the sculptor Malvina Hoffmsn. More than ninety figures, groups, busts and heads are included in this unique series.

In this issue appears a photograph of a section of Chauncey Keep Hall. Physical conditions of its construction and the arrangement of the exhibits make it possible to obtain with a camera only a partial view of the hall and only a few of the sculptures. The hall is divided into four sections, and the exhibits are systematically arranged according to geographical and racial relationships.

The west section of the hall (part of which is shown in the foreground of the accompanying illustration) is devoted to the races of Africa and Oceania. The central section, which is octagonal in shape, contains sculptures of types of the races of America and Europe, and some of Asia. In the adjoining eastern section is continued the display of Asiatic types, the diverse peoples of that continent requiring many more types to represent them adequately than any other geographical region. The fourth section of the hall, a sort of annex, contains supplementary material of value in the study of physical anthropology—types of skulls; samples of hair from various racial groups; types of facial features; types of hands, feet, etc.; casts of brains; examples of head and body deformation practised by various peoples, and other exhibits relating to racial characteristics.

The sculptures showing in the photographs of the hall herewith are (from left to right) those of an Australian bush woman and child, a Semang pygmy of the Malay Peninsula, a Solomon Islander climbing a tree, a Hawaiian riding a surfboard, the symbolical "Unity of Mankind" group which occupies a central position in the hall, a group of pygmies of the Ituri forest in the Belgian Congo, a Shilluk warrior of Africa, and a Senegalese drummer. A close-up view of the Unity of Mankind group will be published in the next issue of the NEWS.

Types of orchids are illustrated in the Hall of Plant Life.

OCTOBER GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for October:

Week beginning September 30: Monday—Geology Exhibits; Tuesday—South American Archaeology; Wednesday—Asiatic Animal Life; Thursday—General Tour; Friday—Trees and Their Uses.

Week beginning October 7: Monday—Life in the Far North; Tuesday—Bird Families of North America; Wednesday—Prehistoric Plants and Animals; Thursday—General Tour; Friday—Egypt and Its Art.

Week beginning October 14: Monday—Indians of the Southwest; Tuesday—Marine Life; Wednesday—Men of the Old Stone Age; Thursday—General Tour; Friday—The Story of Coal.

Week beginning October 21: Monday—Gems and Jewelry of Many Lands; Tuesday—Game Animals; Wednesday—Peoples of the South Seas; Thursday—General Tour; Friday—Uses of Plant Juices, Fruits and Fibers.

Week beginning October 28: Monday—Types of Mankind; Tuesday—Horses, Past and Present; Wednesday—Chinese Art; Thursday—General Tour.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in FIELD MUSEUM NEWS. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From William T. Hewetson—10 herbarium specimens, Illinois; from Dr. A. Ducke—47 herbarium specimens, Brazil; from Harold Vernon—19 trilobite specimens and a specimen of brachiopod, Canada; from Andrew Andrews—a specimen of zinc-lesd-silver ore, British Columbia; from American Doucil Company—2 specimens doucil; from Miss Elizabeth Oliver—4 mineral specimens and 3 concretions, Michigan; from Henry Field—250 herbarium specimens, 129 frogs, lizards, and snakes, 29 specimens of bats, boar skulls, and gazelles, a fox skin, and a grey heron skin, Iraq; from Dr. Erich F. Schmidt—a hyena skull, Iran; from Dr. C. C. Liu—43 frogs, lizards, turtles, and snakes, China; from Gordon Grant—38 tree-toads, toads, snakes, and lizards; from Austin Eastwood—a bear skeleton, Transcaucasia; from James Mooney—a tree snake; from Sam Sakin—a turtle and 5 snakes, Chicago region; from Leslie Wheeler—a dusky horned owl, Oregon; from Dr. Minna E. Jewell—15 specimens of fresh-water sponges, Wisconsin; from Dr. L. A. Hodsdon—5 frogs, 13 lizards, and 9 bats, Bahamas; from Mr. and Mrs. Herman Gesswein—a banana salamander; from Miss Catherine D. Hauberg—5 herbarium specimens, California.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from August 16 to September 14:

Life Members

Emanuel J. Block

Associate Members

J. P. Brunt, Barney Cushman, J. Roberts Hann, H. K. Humphrey, Lester M. Jones, Edward D. Loring, Miss Hedwig H. Mueller.

Annual Members

H. Kirke Becker, Mrs. C. M. Brant, Dr. William F. Briney, Mrs. George Owens Clinch, Mrs. Louis E. Fischer, L. F. Hallett, E. A. Henne, W. J. Holliday, W. R. Kemper, Mrs. Walter C. Leitch, Mrs. Albert Cotter Levis, Miss Marie Loomis, Dr. Maurice L. Richardson, Lee Walker.

Museum Papers at Science Congress

The program of the Seventh American Scientific Congress, held in Mexico City last month, included a botanical paper by Associate Curator Paul C. Standley.

Professor A. C. Noé, Research Associate in Paleobotany, took part in the proceedings of the congress by special invitation and delivered an address.

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GROUP OF NILGAI, LARGEST OF ASIATIC ANTELOPES, ADDED TO KELLEY HALL

By Wilfred H. Osgood
Curator, Department of Zoology

Unlike Africa, Asia does not have in its rich fauna a large variety of handsome and graceful antelopes. The list of those now living is a comparatively short one, including a few small gazelles, several rather aberrant types, and one large, clumsy and somewhat bovine antelope known as the nilgai.

This large animal, although it would attract but little attention in Africa, takes on considerable importance in India. It has therefore been given a place in William V. Kelley Hall of Asiatic Mammals (Hall 17), where a group of three animals, male, female and young, has just been completed.

The word nilgai, which is variously spelled (nilghai, nylgai and nylgau), is formed from native words *nil* (or *lil*) meaning blue and *gau* meaning cow. The name blue bull is also frequently used. This is fairly appropriate, for the male animal is rather bluish or blackish gray in color, and although it is classified with the antelopes, it has simple, untwisted horns and a somewhat broad, bovine nose suggesting the cattle and buffaloes. The females and young are plain brown in color, very different from the male, but both sexes have a short, bristly mane on the neck, and conspicuous, white rings above and below the fetlocks.

Semi-arid plains or rocky ground with sparse and scrubby tree growth are the haunts of the nilgai. A common tree in such regions is the brilliantly flowered dhak tree (*Butea frondosa*) which is said to have much attraction for this animal. The Museum's group, therefore, includes a handsome reproduction of one of these trees bearing great masses of deep orange flowers surmounting the green foliage of its lower branches. The animals appear as in midday, enjoying the shade of the tree.

The nilgai is not a favorite with sportsmen, partly because it is easy to stalk and partly because its short, simple horns do not provide imposing trophies to grace the walls of the hunter. Old bulls may reach a weight of six hundred pounds but their horns rarely exceed eight inches in length. The longest on record had the relatively insignificant length of eleven and three-quarter inches. The nilgai is said to be able to gallop at good speed over rough ground, and in some cases hunters have found good sport in riding it down on horseback, but this can be done only under especially favorable conditions.

Nilgai or Blue Bull

There is a striking color difference between male (on right) and female (on left). The animals in this new group were collected by the late Colonel J. C. Faunthorpe, and mounted by Staff Taxidermist Julius Friesser.

At the present time this animal is restricted to central India, from the base of the Himalayas to the province of Mysore on the south, and from eastern Punjab to parts of the Bombay Presidency. Apparently it has occupied this region for a very long time since its fossilized remains are found in India not only in Pleistocene formations but also in the more ancient Pliocene. It bears some relationship to large African antelopes such as the eland and the koodoo, and perhaps it is a survivor from a time in southern Asia when many other species of this type existed there. It is absent from Ceylon and all similar forested areas, since its preference for dry, open country is marked. It is independent of water, although, like many other antelopes, it drinks regularly when water is available. It is preyed upon by the tiger, the leopard, and packs of wild dogs.

As far back as 1767 one of these antelopes was sent to England and successfully kept for exhibition. Since that time it has been a common animal in zoological gardens. It breeds and thrives in captivity.

The specimens for the Museum's group were collected by the late Colonel J. C. Faunthorpe, of Bombay, and prepared by Staff Taxidermist Julius Friesser, assisted by Mr. W. E. Eigsti. The dhak tree reproduction is by Mr. Frank Letl; the background by Staff Artist Charles A. Corwin.

QUININE

By Paul C. Standley
Associate Curator of the Herbarium

It is singularly appropriate that tropical America, where malaria is the greatest plague, should first have produced quinine, the best remedy for this malady. Almost every person in that region is stricken sooner or later with malaria. The loss of efficiency is incalculable, while death is frequent among the poor where proper treatment is not always available.

Among the exhibits in the Hall of Plant Life (Hall 29) devoted to the family of Rubiaceae is a specimen of cinchona bark, the source of quinine. There are mythical stories current of the virtues of quinine having been discovered by watching the pumas or mountain lions of South America chewing the bark of cinchona trees to cure their fevers. Another tale is that it was discovered by an Indian drinking the waters of a lake into which a cinchona tree had fallen.

Apparently the Indians had been aware of the medicinal value of cinchona bark for some hundreds of years before the arrival of the Spaniards, but had been largely indifferent to or even prejudiced against use of the drug.

In 1638 the Countess of Chinchon, wife of the Spanish viceroy of Peru, was cured of a severe fever by the use of this bark. This cure, regarded as miraculous, made a tremendous impression on Europeans in America. It even inspired the writing of a novel, "Zuma," by Mme de Genlis. The Countess of Chinchon, from whose name was later derived the name of the tree, cinchona, returned to Spain with quantities of the bark, and distributed it among the sick on her husband's estates. It soon became widely known in Europe, and it was not long before it was an article of commerce. Louis XIV of France paid Sir Robert Talbor, an English doctor, 2,000 louis d'or, a large pension, and conferred a title upon him, for the secret of preparing quinine. Thenceforth it became recognized as the most efficacious remedy for intermittent fevers.

Stencils cut from birch bark by the Naskapi-Montagnais Indians of Labrador, and used in painting designs on skin and as guides in making embroidery, are on exhibition in James Nelson and Anna Louise Raymond Hall (Hall 4).

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

FIELD MUSEUM NEWS

Stephen C. Simms, *Director of the Museum*.....*Editor*

CONTRIBUTING EDITORS

Paul S. Martin.....*Acting Curator of Anthropology*
B. E. Dahlgren.....*Curator of Botany*
Henry W. Nichols.....*Curator of Geology*
Wilfred H. Osgood.....*Curator of Zoology*
H. B. Harte.....*Managing Editor*

Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

MODEL SHOWS CHICAGO AREA SUBTERRANEAN STRATA

By Henry W. Nichols
Curator, Department of Geology

In the tropics, semi-tropics, and other regions not reached by the ice of the glacial period, the soil often changes so gradually into the rock below that no one can tell where the soil ends and the rock begins. In glaciated regions such as the country around Chicago, conditions are very different. The advancing continental glacier scoured away the original soil and any unsound weathered rock, leaving a smooth hard rock surface. When the ice of the retreating glacier melted, it left a cover of gravel, sand and mud over the rock surface. But this cover was not even, it was thick in some places and thin in others, so that the top surface of the new soil has no relation to the contour of the hard rock below. A hill on the surface may be over a valley in the rock, or a depression in the soil may overlie a peak in the rock.

This is strikingly shown by a model in Clarence Buckingham Hall (Hall 35). This model represents surface farmland in the country near Chicago with its green fields, farm buildings and fences. The farm represented is on stony glacial gravel which has a gently rolling surface and lies on a sharply defined rugged limestone surface below. The form of the surface of the ground is seen to have no relation to the rugged rock surface with its ridges and valleys below.

STUDY OF SNAKE MIGRATION AND HIBERNATION BEGUN

By Karl P. Schmidt
Assistant Curator of Reptiles

One of the most interesting subjects in zoology is the means various animals employ for passing the winter. All reptiles and amphibians in northern countries become dormant during this season. Hibernation requires a refuge from the cold where complete freezing of the body cannot occur. Many insects, on the other hand, can freeze solidly without injury. A number of reptiles, such as turtles, may have their extremities frozen, but none can survive freezing of the heart. Aquatic reptiles, frogs, and salamanders gather in swamps and ponds where they hibernate in the mud, while toads and many snakes, the box turtle and all hibernating mammals take refuge in dry places.

Among cold-blooded reptiles a gathering from a wide area to a specific hibernation den may take place in the fall. This is especially well-known of rattlesnakes, copperheads, and water moccasins. The eastern blacksnake is said to have the same habit, and to share the dens of the timber rattlesnakes and copperheads. At the time of going into hibernation these snakes seem to be completely indifferent to each other's presence, although the blacksnake during the summer may make an occasional meal of a rattler.

In the middle west the well-known blue racers take the place of blacksnakes, and apparently gatherings into a winter den occur among them also. A remarkable aggregation of this sort was discovered in the Indiana Dunes region about the middle of October by the writer, accompanied by Mr. Bryan Patterson of the Department of Geology. Among the old oak-covered dunes, within an area not greater than an acre, an extraordinarily large colony of blue racers, numbering between fifty and one hundred individual snakes, was found. These snakes, never seen in such numbers before by the writer, were sunning themselves in open places, and tracks in the loose sand showed that they had gone in and out of old woodchuck burrows. Many had climbed into bushes where they lay extended on horizontal branches. The average size was between four and five feet, and all had the glossy fresh appearance of snakes which had recently shed their skins. The surrounding dune areas seemed to be free of blue racers. Occasional blue racers may be observed throughout the Dunes region during the summer, but it is most unusual in the experience of Chicago naturalists to see more than one or two of these handsome active snakes in the course of a day.

The aggregation of snakes into hibernating colonies is a matter of considerable scientific interest, and very little is known about it, although it is suspected that this fall concentration of blue racers may have been observed by old residents of the Dunes and hikers who frequent the region.

As a means of studying the numbers of snakes involved and the distances to which and from which they travel, twenty-six specimens of the colony discovered in the Dunes were marked by the writer, and Messrs. L. L. Walters and E. G. Layhourne, by a system of scarring individual scales beneath the tail. More important observations will accrue from the study of living specimens in the wild state than from the accumulation of further museum specimens preserved in alcohol, although the total number of specimens of blue racer in the collections of Field Museum and the Chicago Academy of Sciences together is only eleven.

Specimens found dead on the roads in the Dunes region, if not too much crushed, will still be welcome additions to the study collections of either of these institutions, however, and persons finding them are requested to send them. Living specimens of the blue racer, which is an entirely harmless creature, actually beneficial to agriculture in the general economy of Nature, should not be molested. Local naturalists, by repeated visits to the places of hibernation, will be able to fill out the unknown parts of the life history of the snakes.

Change in Visiting Hours

Effective November 1, and continuing until March 31, winter visiting hours—9 A.M. to 4:30 P.M.—will be observed on weekdays at Field Museum; 9 A.M. to 5 P.M. on Sundays.

Post Card Sets

Educational series of photogravure post cards illustrating different phases of anthropological, botanical, geological and zoological subjects, are published and sold by Field Museum. These have proved to be a valuable medium of disseminating scientific information. Each set contains from six to thirty cards with picture and instructive text. Prices range from 10 cents to 50 cents depending upon the number of cards in the set. A list of the subjects may be obtained from the Museum on request.

Swanflower

At the same time one of the most strikingly attractive in appearance yet most disgustingly malodorous of tropical plants is the huge swanflower of Central America and the Antillean islands. A reproduction of it, and a model showing its structure, are on exhibition in the Hall of Plant Life (Hall 29). It is the largest flower of the region to which it is native.

FIVE LECTURES TO BE GIVEN DURING NOVEMBER

Five more lectures in the autumn course for adults, remain to be given on Saturday afternoons during November. All the lectures begin at 3 P.M., and are to be presented in the James Simpson Theatre of the Museum. They are illustrated with motion pictures and stereopticon slides. Following are the subjects, speakers and dates:

November 2—The Second Byrd Antarctic Expedition
Dr. Thomas C. Poulter, Mount Pleasant, Iowa; Second-in-Command of the Expedition

November 9—Africa in South America
Hendrik de Leeuw, New York City

November 16—Tibet—Forbidden Land of Magic and Mystery
Harrison Forman, New York City

November 23—Plants Without Soil and Other Miracles in Nature
Arthur C. Pillsbury, Berkeley, California

November 30—Sails Over Ice
Captain Robert A. Bartlett, New York City

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats on request. Requests for these seats may be made by telephone or in writing to the Museum, in advance of the lecture, and seats will then be held in the Member's name until 3 o'clock on the day of the lecture. Members may obtain seats in the reserved section also by presentation of their *membership cards* to the Theatre attendant before 3 o'clock on the lecture day, even though no advance reservation has been made. All reserved seats not claimed by 3 o'clock will be opened to the general public.

LAMAIST CEREMONIAL APRON

Among interesting curiosities from mysterious Tibet, exhibited in the Department of Anthropology, is a rare ceremonial bone apron used in sacred rites of Tibetan Lamas for exorcising demons. It is on view at the north end of the East Gallery.

This type of sacred object is seldom seen outside Tibet because it is considered as a part of the temple treasure and, accordingly, kept well guarded. The example exhibited in the Museum consists of twenty-three large oblong pieces carved, supposedly, from human thigh bones, and eighteen rhomboid pieces of bone, fastened together by cords. The oblongs are decorated with figures of strange deities, and the others with emblems of the Lamaist cult. The carving shows great beauty and excellence of technique. That the apron is probably quite old is indicated by various signs of wear and tear it displays.

A TIBETAN BOAT MADE OF SKINS

By Paul S. Martin
Acting Curator, Department of Anthropology

A Tibetan boat made of animal skins has been placed on exhibition in Hall 32.

This type of boat, which is the only kind made and used by the Tibetans, is called a coracle (a word derived from the Welsh *corwgl*, "a carcass" or "boat"). It is made of yak hides which are stretched over a frame of bent willow twigs. The hides are sewed together by means of rawhide ropes, and the holes created thereby are plugged with butter to prevent leakage. In shape these boats are like a hollow hemisphere. The one on exhibition is about five and one-half feet in diameter, and three feet high.

The boatman kneels on the bottom of the boat and directs it, by means of a short paddle, to the opposite shore. Complications arise from the drift downstream caused by the current. These boats are capable of carrying three or four men or two men and about two hundred pounds of goods. Generally, there are only two or three such boats available at a ferry station, and consequently it may take a large caravan a whole day to effect a crossing.

The boat on exhibition was used several times by the late Dr. Berthold Laufer while traveling in Tibet as leader of the Blackstone Expedition to China, 1908–10. He later purchased it for the Museum. It is a notable addition to the collections, as such boats are rarely exhibited in this country.

Coracles were once widely distributed over the northern part of the Old World. They were used in Britain at the time of

Tibetan Coracle
Strange boat made of yak skins, the seams caulked with butter. Used for crossing rivers. On exhibition in Hall 32.

the Roman invasion, as well as in western Asia and many parts of India. Alexander the Great availed himself of such boats on his expedition in the Orient. The so-called "bull boats" used by the Mandan Indians of the Upper Missouri River were constructed in a similar fashion. Even today, coracles are still extensively employed as fishing boats on the Severn and other Welsh rivers.

HOW URUGUAYAN AGATE FIELD WAS DISCOVERED

Most of the world's supply of agate comes from a region, remote and difficult of access, in the north of Uruguay. There the rough agates now on display in Hall 34 were collected by the Marshall Field Brazilian Expedition of 1926. A member of the expedition was told by Mr. Julio Schuch, the largest operator in the district, the story of the discovery of this agate field. According to Mr. Schuch agates were discovered in Uruguay about 1860 by a German boy who came from Oldenburg, a center of the German agate industry. This boy had been fighting in the Brazilian army. When the war or revolution was over foreign soldiers were no longer wanted in the Brazilian army and they were removed in the most informal manner. This boy was conducted across the border into Uruguay and told not to come back. Wandering through the Catalan district of Uruguay he noticed agates in the stream beds. As he had been reared in an agate-working community he recognized the value of the material and wrote to his uncle in Germany about it. His uncle came to Uruguay and established the industry. —H.W.N.

ADDITIONS MADE TO EXHIBIT OF FROGS AND SALAMANDERS

The frogs, toads, and salamanders in the systematic exhibit of reptiles and amphibians in Albert W. Harris Hall (Hall 18) have recently been reinstalled. Eleven new models, prepared by Staff Taxidermist Leon L. Walters, have been added.

The additions include two handsome species of North American tree frogs, as well as the large green Australian tree frog, and the very remarkable African clawed frog which is entirely aquatic. The last of these represents one of the most distinct of the families into which the frog group is divided.

Five additions to the salamanders of the United States include specimens of the marbled, two-lined, red-backed, and Great Smokies salamanders, and the extraordinary large eel-like species known as "Congo eel" which is one of the strangest of American animals. A model of the handsome banana salamander of Guatemala was made possible by the receipt of a living specimen which reached Chicago in a commercial shipment of bananas. For the first time there is exhibited also a specimen of the Mexican axolotl. The axolotl is a strange salamander which lives in the lakes near Mexico City as a "permanent larva," breathing by means of large external gills. In captivity it has been known to transform into a salamander of the ordinary land type, much like the common tiger salamander.

The occasion of rearranging this case was utilized for a complete revision of all labels concerning the amphibians. These are now printed in larger and more legible type and are provided with individual maps showing the distribution of the species.

ANCIENT SPRUCE IN ILLINOIS

Two spruce cones found embedded in marl at a depth of twenty feet from the surface of a thick deposition of peat on the margin of Grass Lake in Lake County, Illinois, and recently presented to Field Museum, afford opportunity for an interesting ecological note. They testify to the presence in early post-glacial times, from 25,000 to 30,000 years ago, of spruce forests in this region. Today the southern limit of spruce is some three hundred miles to the north, spruce forests not occurring farther south than northern Michigan and Wisconsin.

Certain pollen analyses of northern Illinois peat bogs corroborate this evidence of the former presence of spruce forests in the Chicago region. The abundance of spruce pollen indicates that this tree was possibly the predominating coniferous tree in early post-glacial times.

The cones received at the Museum are a gift from Mr. C. N. Ackerman, of Chicago and Antioch, Illinois, an Associate Member of the Museum. The cones have been tentatively identified as those of *Picea canadensis*. —B.M.S.

Dr. Baehni Returns to Geneva

After fourteen months spent at Field Museum, Dr. Charles Baehni, of the Conservatoire et Jardin Botaniques of Geneva, Switzerland, returned to Europe recently. Dr. Baehni had been engaged here in studies of the American flora and in research upon the Sapotaceae or sapodilla family. In addition, he assembled duplicate material to be sent to the Geneva Herbarium, as the result of a cooperative project arranged by the Museum with Dr. B. P. G. Hochreutiner, Director of the Geneva institution.

CHILDREN'S PROGRAMS OFFERED BY RAYMOND FOUNDATION

The autumn series of free motion picture programs for children on Saturday mornings, provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures, will continue throughout November. There will be two showings of the films on each program, one beginning at 10 A.M., and one at 11, in the James Simpson Theatre of the Museum. Children from all parts of Chicago and suburbs are invited to attend. They may come alone, in groups from schools and other centers, or with parents, teachers or other adults.

The titles of the films to be shown on each date will be found in the following schedule:

November 2—Jungle Giants; The Veldt; The Wrestling Swordfish; The Prowlers.

November 9—The Jenolan Caves; The Declaration of Independence.

November 16—Winners of the West: The Departure of the Covered Wagons; Indians at Home; Buffalo Bill; The Pony Express; Within the Stockade.

November 23—Mt. Vesuvius and Its Neighbors; Small Cats and Monkeys; Glimpses of Rome; Turtles of All Lands; Kangaroos.

November 30—The Lapps and Their Reindeer; Wearers of Fur and Quills; Prehistoric Lake Dwellers; Falling Snow.

A NEW FUND FOR PUBLICATIONS ON AMERICAN ANTHROPOLOGY

In 1886 Dr. Frederick Webb Hodge made his first archaeological expedition. His career in anthropology reaches its fiftieth anniversary in 1936. The occasion is to be marked by creation of the Hodge Anniversary Publication Fund, under the guidance of a committee of eminent anthropologists. An editorial board will select for publication works on American anthropology. Southwest Museum, of which Dr. Hodge is director, will administer the fund.

Publications will be sold at approximate cost. Contributors who desire will receive *pro rata* credit in publications to the amount of their contribution in dollars. Contributions should be sent to Hodge Fund, Southwest Museum, Los Angeles.

Dr. Hodge is a pioneer of American anthropology. A founder of the American Anthropological Association, he edited its journal, the *American Anthropologist*, for fifteen years. He has made many important studies of aboriginal America. The fund bearing his name offers friends and admirers opportunity to honor him, and to help increase the meager existing facilities for publication of research in American prehistory.

"THE UNITY OF MANKIND"

The bronze group "Unity of Mankind," by the sculptor Malvina Hoffman, shown in the accompanying illustration, occupies the center of Chauncey Keep Memorial Hall (Hall 3), where it strikes the keynote of the entire Races of Mankind series of sculptures. This group consists of three bronze statues in heroic size, representing a white, a yellow, and a black man, forming a circle around a pilaster which is surmounted by a globe upon which are outlined in high relief the five continents as the habitat of humanity. The group symbolizes the unity of mankind as a well-defined, fundamentally uniform species which has spread all over the earth and now occupies almost every habitable area.

This monumental group is a gift to the Museum from Mrs. Charles H. Schweppe, of Chicago, who is the donor also of various others of the sculptures in Chauncey Keep Hall.

Chosen as models for this group were the finest physical types available of the three principal racial divisions, white, black and yellow. Each of these portraitures displays, in noteworthy degree, the excellent workmanship and fine artistry for which Miss Hoffman is so noted, and which was responsible for her selection to carry out the long and difficult task of preserving in bronze and stone types of all the world's principal races—some of them dying races of which in years soon to come these sculptures may be especially important records.

Unity—White, Yellow, and Black Man

Bronze group by Malvina Hoffman, occupying the center of Chauncey Keep Memorial Hall (Hall of the Races of Mankind). The group, which is a gift from Mrs. Charles H. Schweppe, symbolizes the basic uniformity of mankind despite racial differences.

Original photographs, and photogravure post card views of this, and most of the other Races of Mankind sculptures, may be purchased at the Museum. Mail orders promptly handled. By special arrangement reproductions in bronze may also be purchased.

Ancient Egyptian pottery on exhibition in Hall J ranges in date from about 2400 B.C. to A.D. 400.

NOVEMBER GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for November:

Friday, November 1—Glimpses of African Life.

Week beginning November 4: Monday—Fishes, Past and Present; Tuesday—Races of Mankind; Wednesday—Plants and Animals of the Past; Thursday—General Tour; Friday—Palms and Cereals.

Week beginning November 11: Monday—Indians of Woods and Plains; Tuesday—Unusual Animals; Wednesday—Etruscan and Roman Exhibits; Thursday—General Tour; Friday—Rocks and Minerals.

Week beginning November 18: Monday—Amber, Turpentine and Rubber; Tuesday—Bird Exhibits; Wednesday—Jades; Thursday—General Tour; Friday—Hall of Plant Life.

Week beginning November 25: Monday—North American Archaeology; Tuesday—Skeletons; Wednesday—Moon and Meteorites; Thursday—Thanksgiving holiday, *no tour;* Friday—Egyptian Hall.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in FIELD MUSEUM NEWS. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From E. C. Grossman—2 shrunken human heads, Peru; from Professor A. O. Garrett—66 herbarium specimens, Utah; from William A. Schipp—77 herbarium specimens, British Honduras; from George L. Fisher—88 herbarium specimens, Mexico; from School of Forestry, Yale University—128 herbarium specimens, Colombia; from D. C. Peattie—657 herbarium specimens, southeastern United States; from Professor Manuel Valerio—72 herbarium specimens, Costa Rica; from W. T. Hewetson—5 herbarium specimens and a water-color painting, Illinois; from Professor G. W. Graves—cones of Araucaria, California; from David Waddington and Hubert Beddoes—5 horned toads, Colorado; from Wallia Huidekoper—3 wolf skins, Montana; from Chicago Zoological Society—6 snakes and 10 lizards; from Leslie Wheeler—an eagle, a kite, and 2 hawks, Panama; from Edward J. Brundage—56 insects, Connecticut; from Charles N. Ackerman—one specimen of vivianite on clay and two of fossil cones, Illinois; from George H. Hawes—a fossil cephalopod, Illinois; from Louis Speiden Company—a trilobite and 3 specimens of silica, Illinois; from West Coast Mineral Association—9 specimens of ore, Washington; from K. Ogaki—12 fossil leaves and a fragment of fossil turtle, Manchukuo; from Herbert C. Walther—7 specimens of fossil fern leaves and one of pyrite crystals, Illinois; from Chicago, Milwaukee, St. Paul and Pacific Railroad Company—21 reels of motion picture films; from Resources Corporation International—21 boards of hardwoods, southern Mexico; from Dr. Alfred Emerson—17 bats, Panama; from American Institute for Persian Art and Archaeology—8 pottery objects, Kish, Iraq.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from September 16 to October 15:

Associate Members

Jerome J. Kanter, John H. Merrell, Miss Janet O'Brien, Herbert S. Ullmann, Mrs. Edward Kenneth Welles.

Annual Members

Mrs. Harry R. Applegate, Mrs. Joseph Henry Biggs, Fritz Blocki, Nathan S. Blumberg, Dr. M. D. K. Bremner, Oscar B. Depue, Henry C. Dosch, John W. Evers, Jr., Owen O. Flory, Mrs. H. A. Frick, Miss Annie Goldfinger, Mrs. Morgan T. Jones, Dr. M. T. MacEachern, Dr. Hugh N. MacKechnie, J. Waller Marshall, Robert W. Martin, Webb W. Martin, L. H. Matthews, Mrs. George J. Meyer, Clarence Morgan, Mrs. Michael F. Mulcahy, Hugh Newman, Harold W. Norman, C. W. Perkins, Miss Edith Rea, Walter A. Rogers, John Rudin, Miss E. C. Stanley, Miss Louise A. Stift.

A remarkably large cut aquamarine, weighing 341 carats, is exhibited in H. N. Higinbotham Hall (Hall 31).

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ANCIENT VOTIVE PYRAMID OF TOLTECS IN MEXICO IS REPRESENTED BY MODEL

By Paul S. Martin
Acting Curator, Department of Anthropology

A miniature model of the Pyramid of Quetzalcoatl, recently obtained from the National Museum of Mexico, is now on view at Field Museum in Hall 8. It is a strikingly accurate reproduction of the original, and makes a most attractive exhibit.

The Pyramid of Quetzalcoatl is in the ancient town now called San Juan Teotihuacan, a few miles northeast of Mexico City. On this site are also the Pyramids of the Sun and the Moon, and a straight roadway—the Street of the Dead.

Near one end of the Street of the Dead is a spacious quadrangular plaza surrounded by fifteen small flat-topped pyramids. This group is known as the Citadel, although the buildings probably formed a sacred unit. In the center is the recently excavated Pyramid of Quetzalcoatl (a name derived from Aztec words meaning *bird-serpent* or *plumed serpent*). Quetzalcoatl was a deity of great importance, worshipped throughout middle America. Primarily god of the winds, he was also the deity of agriculture, and of the planet Venus.

The Pyramid of Quetzalcoatl

Miniature model of a great monument of the ancient Toltecs, now on exhibition in Hall 8. Human sacrifices to the gods of rain and other deities were made on this edifice.

The pyramid is about fifty-four feet high; its base is square, measuring about 210 feet on a side. On the summit formerly stood a temple, but no traces of it survive. Probably this pyramid was erected by the Toltec Indians about A.D. 1100.

The structure is divided into six sections by set-backs in the sloping walls. These set-backs form narrow terraces around which processions of priests once wended their way in ceremonial ascents or descents. The decoration of the framed panels beneath each terrace consists of conventionalized masks of the rain god, Tlaloc, alternating with feathered serpent-heads. Each head projects from a feathered ruffle, and displays a terrifying set of fantastic teeth. Aprons below the panels are ornamented with full-length feathered snakes sculptured in low relief.

On the west face is a broad stairway of fifty-eight steps, its balustrade ornamented with serpent heads. All decorations were stucco-covered and painted in bright colors.

Construction of such a pyramid must have been a gigantic task for a people whose building methods were primitive. After the ground was cleared of all vegetation, crude walls were erected to enclose the area. The space within was filled with stone and earth. This mass was then cased with large hewn stones forming the outer sloping walls. The big serpent-heads were attached by long stone pegs or tenons. The large slabs with which the building was veneered were held in place by a kind of concrete.

The Pyramid of Quetzalcoatl, as well as the pyramids of the Sun and Moon, is classed as a votive monument. The small sanctuary on the summit was secondary to the massive structure which supported it and symbolized for the people their gods of work, pain, blood, and tears. Here, within or in front of the sanctuary, were performed dramatic ceremonies which sometimes included human sacrifice. During the dry season rituals were dedicated to the rain gods, to aid crops. The month in which these ceremonies were held was given a name meaning "the buying of the rains." Children were occasionally sacrificed, and it was believed that if the victims wept excessively, heavy rains would fall. Other ceremonies were rendered for the gods of corn, flowers, maguey, beans, and the soil. There were also special ceremonies for each of the eighteen months into which the Toltecs divided the year.

The largest structure at San Juan Teotihuacan is the Pyramid of the Sun, on the east side of the Street of the Dead. It is 215 feet high and has a frontage of 716 feet. The summit is a level platform about 130 feet square. A temple formerly stood on the platform, but has long since rotted away. There is no evidence that this structure was devoted to sun worship—its name was applied after the Spanish conquest. The ceremonies were probably the same as those held on the Pyramid of Quetzalcoatl.

The third well-known building at Teotihuacan is the Pyramid of the Moon, located at one end of the Street of the Dead. It is rectangular rather than square, measuring about 400 by 500 feet; and it stands approximately 140 feet high. This structure has been only partially explored and little is known about it. That it was not devoted to worship of the moon, however, seems certain.

About the Toltecs, credited with erecting these structures, few facts have been learned. The word Toltec—used by the Aztecs to describe their predecessors who were, supposedly, founders of Mexico's "Golden Age"—actually means "a skilled worker." Aztec legends described these people as skilled workers of turquois and jadeite.

The traditional capital of the Toltecs was Tula, situated just north of Teotihuacan. Legends refer to a "Toltec Empire," overthrown in the thirteenth century. This may have been merely a federation of communities. Tula may have been the civil capital, and Teotihuacan the principal religious center and source of culture for the Valley of Mexico. Pending further excavations or discovery of hieroglyphic inscriptions, Toltec history must remain largely unknown.

CHRISTMAS SHOPPING MADE EASY BY MUSEUM MEMBERSHIP PLAN

As in past years, Field Museum has made special arrangements whereby its Members may easily solve some of their Christmas gift problems.

You may present memberships in the Museum to your friends and relatives with a minimum of time and effort. Just fill in the name and address of the proposed Member, and your own name and address, on the application blank enclosed with this issue of Field Museum News, and insert it with check in the accompanying postage-prepaid addressed envelope. Drop it into a mailbox—all other details will be taken care of for you by the Museum. You are saved from the jostling Christmas shopping crowds, and the burden of preparing and sending packages is eliminated.

The Museum will send an attractive Christmas card to whomever you propose, bearing notification that, as a gift from you, a membership has been taken out in his or her name. It will also inform the recipient of your gift as to what the privileges of membership are.

A Museum membership is a distinctive type of gift, which conveys to the recipient a high compliment from you through its implication that you consider him to be a person of those qualities of intellect which would make him appreciate and value membership in a scientific and cultural institution. It is a gift that will bring you to the recipient's mind many times a year, as the monthly issues of Field Museum News reach him, and as he obtains his reserved seats for Museum lectures, and avails himself of the other membership privileges.

It is advisable to send in applications before December 17 to assure delivery of the greeting and notification cards to the recipients of your gifts by Christmas Day.

Field Museum of Natural History

Founded by Marshall Field, 1893

Roosevelt Road and Lake Michigan, Chicago

FIELD MUSEUM NEWS

Stephen C. Simms, *Director of the Museum*.....*Editor*

CONTRIBUTING EDITORS

Paul S. Martin.....*Acting Curator of Anthropology*
B. E. Dahlgren.....*Curator of Botany*
Henry W. Nichols.....*Curator of Geology*
Wilfred H. Osgood.....*Curator of Zoology*
H. B. Harte.....*Managing Editor*

Field Museum is open every day of the year during the hours indicated below:

Nov., Dec., Jan., Feb., Mar.	9 A.M. to 4:30 P.M.
April, September, October	9 A.M. to 5:00 P.M.
May, June, July, August	9 A.M. to 6:00 P.M.

Admission is free to Members on all days. Other adults are admitted free on Thursdays, Saturdays and Sundays; non-members pay 25 cents on other days. Children are admitted free on all days. Students and faculty members of educational institutions are admitted free any day upon presentation of credentials.

The Museum's natural history Library is open for reference daily except Saturday afternoon and Sunday.

Traveling exhibits are circulated in the schools of Chicago by the N. W. Harris Public School Extension Department of the Museum.

Lectures for schools, and special entertainments and tours for children at the Museum, are provided by the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Announcements of free illustrated lectures for the public, and special lectures for Members of the Museum, will appear in Field Museum News.

A cafeteria in the Museum serves visitors. Rooms are provided for those bringing their lunches.

Chicago Motor Coach Company No. 26 buses go direct to the Museum.

Members are requested to inform the Museum promptly of changes of address.

MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Benefactors give or devise $100,000 or more. Contributors give or devise $1,000 to $100,000. Life Members give $500; Non-Resident Life and Associate Members pay $100; Non-Resident Associate Members pay $50. All the above classes are exempt from dues. Sustaining Members contribute $25 annually. After six years they become Associate Members. Annual Members contribute $10 annually. Other memberships are Corporate, Honorary, Patron, and Corresponding, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to Field Museum News is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Cash contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are tax-free and are guaranteed against fluctuation in amount.

MANY RARE BOOKS PRESENTED BY PRESIDENT FIELD

A collection of extremely rare and valuable books, numbering one hundred volumes, which had formed part of the library of Mr. Stanley Field, President of Field Museum, was recently presented by him to the Library of this institution. These books, most of them very old, long out of print, and difficult to obtain, are especially important as source material for use in connection with research work.

Famous records of voyages and discoveries from the eighteenth and early nineteenth centuries are especially well represented, while a few of the books date back to the seventeenth and sixteenth centuries. Many of them are remarkable examples of fine printing, illustration, and binding, as well as being important for their textual content. Some are illustrated with excellent color plates, others with fine woodcuts and steel engravings. There are beautiful examples of finely-made decorative covers, the work of skilled hand-craftsmen who have practically no successors in the present mechanical age.

One of the most important items in the collection consists of eight volumes of *Cook's* (Captain James) *Voyages*, accompanied by an additional volume of illustrations, dating from 1768 to 1784. Five beautifully bound volumes of *Hakluyt's Collections of the Early Voyages* (1809-12) constitute another outstanding item. Others of special interest, to mention only a few, include *The Kafirs Illustrated* (1840), by George French Angus; *Voyage Round the World in the Years 1740-44*, by George Anson; *Voyage aux Indes-Orientales* (1825-29), by Charles Bélanger; *Notes on a Journey in America* (1818), by Morris Birkbeck; *Chronological History of Voyages and Discoveries in the South Sea* (1579), by James Burney; William Dampier's *Voyages* (1729); *A New Discovery of a Vast Country in America—New France* (1698), by L. Hennepin; *America* (1671), by John Ogilby; and *A Voyage Round the World* (1789), by Captain Nathaniel Portlock.

TRUSTEE RAWSON RESIGNS

Because of ill health and the fact that he is spending considerable time in Pasadena, California, Mr. Frederick H. Rawson has resigned from the Board of Trustees of Field Museum. His resignation was regretfully accepted at the meeting of the Board held October 21.

Mr. Rawson had been a member of the Board since August, 1927. He has contributed most generously of his time and effort, as well as large amounts of money, toward the welfare of the institution. Even prior to his election as a Trustee, in 1926, he organized and financed the First Rawson-MacMillan Subarctic Expedition of Field Museum. The following year he furnished funds for the larger Second Rawson-MacMillan Subarctic Expedition which spent some fifteen months in Labrador and Baffinland. Both of these expeditions, under the leadership of Lieutenant-Commander Donald B. MacMillan, noted Arctic explorer, resulted in valuable collections for the Departments of Anthropology, Geology and Zoology. In 1929 a third expedition was sponsored by Mr. Rawson: the Frederick H. Rawson-Field Museum Ethnologial Expedition to West Africa which obtained extensive collections in Angola (Portugese West Africa) and Nigeria for the Department of Anthropology. When the Museum undertook the creation of its unique and important Hall of the Stone Age of the Old World (Hall C), Mr. Rawson contributed $18,000 toward the preparation of the groups restoring types of prehistoric man. Altogether his contributions to the Museum total more than $93,000. As a Trustee he served ably as a member of the important Finance Committee of the Board.

His fellow Trustees join in wishing him health and happiness.

—STEPHEN C. SIMMS,
Director and Secretary

HENRY FAIRFIELD OSBORN

1857–1935

In the passing of Dr. Henry Fairfield Osborn, Honorary President of the American Museum of Natural History, New York, the sciences of earth-history have lost one of their most active exponents. He was not only a great teacher and a tireless worker, but a promoter of museums and of scientific activity.

Dr. Osborn was a prolific writer. Nearly one thousand scientific articles, lectures and addresses, as well as a number of outstanding books, bear his name. He dealt with fossil animals as the material evidence of animal history and evolution. He popularized the subject—brought it to the interest and the understanding of the layman. In later life he challenged a rising tide of criticism of the Darwinian doctrines and remained their champion to the end.

Dr. Osborn died November 6. His death is a loss which will be felt at Field Museum as at all other institutions devoted to science.

—E. S. R.

MUSEUM TO CLOSE CHRISTMAS AND NEW YEAR'S DAY

For the first time in many years, Field Museum will be closed on Christmas and New Year's day. This action is being taken to permit as many guards, janitors and other employes as possible to spend these holidays with their families. Only such watchmen as are necessary for safety will remain on duty. Hitherto the Museum has remained open every day of the year, including all holidays, but experience has shown that so few visitors come on Christmas and New Year's that closing on those days should cause little if any inconvenience to the public.

PEANUT WALNUT

Field Museum recently received a gift from Mr. Ralph Throp of curious "peanut walnuts," produced by a tree growing on his farm near Greensburg, Indiana. Only one other similar tree, somewhere in Ohio, is known.

The peanut walnut is a freak form of the common black walnut of the United States. Viewed from the outside, there is nothing remarkable about the appearance of the nuts, but when opened, the kernel or meat falls out or may be removed easily in a single piece. The kernel is only half of an ordinary kernel, in form, but is larger.

The advantages of such a kernel, which can be removed whole, are apparent, and it would be highly desirable to propagate the tree commercially. Grafting experiments, however, have so far been unsuccessful, and it is questionable whether a freak or sport of this kind would be reproduced in seedlings.

NO EXTRA-TERRESTRIAL LIFE FOUND IN METEORITES

By Sharat K. Roy
Assistant Curator of Geology

How and whence came life on earth? This problem has kindled man's imagination for generations, but due to lack of precise facts it has remained unsolved. Many noted investigators of physical and biological phenomena have studied the question. Richter speculated on the possibility that microorganisms pervaded all space. Following the same line of thought, Arrhenius reasoned that under certain favorable conditions the pressure of light could drive spores from outer space to our planet and thus seed it with life. Von Helmholtz and Lord Kelvin suggested that meteorites might have been responsible for bringing the original forms of life to the earth.

This last suggestion has been raised to the dignity of a theory by Professor Charles B. Lipman, of the University of California, who, in 1932, reported the finding of living bacteria in stony meteorites and interpreted the organisms to be of extra-terrestrial origin. This alleged discovery was received by laymen with philosophical interest, and by geologists and bacteriologists with skepticism, but because of its spectacular nature it was accorded wide publicity.

Without either accepting or denying the plausibility of Professor Lipman's theory, Field Musem, along with other scientific institutions, made available to him material from its meteorite collection upon which to conduct experiments. An account of the results reported by Professor Lipman was written for Field Museum News by the late Dr. Oliver C. Farrington, former Curator of the Department of Geology, and appeared in the March, 1933, issue. Dr. Farrington therein commented that "far more investigation is necessary before satisfactory conclusions can be drawn."

The interpretation proposed by Lipman is of such fundamental significance that before its acceptance, it should be shown to rest on indisputable evidence. For this reason, the present writer undertook to repeat Lipman's experiments, closely following his technique and culture media so that the two results might be directly comparable. Four stony meteorites, (1) Holbrook, (2) Mocs, (3) Pultusk, and (4) Forest City, were used for the purpose, the first three of which belong to the same falls as three of the five falls used by Lipman in his final experiments.

The method of investigation was as follows: The exterior of each meteorite was first sterilized, then dropped in a flask containing sterile culture media and incubated aerobically (i. e., in the presence of air) for twelve weeks, and anaerobically (in a vacuum) for sixteen weeks. Under these conditions, if the surfaces of the meteorites were not sterilized, growth would appear. But in all cases no growth appeared. Inside a sterile chamber, each specimen was then crushed separately in an especially devised sterile mortar, and the powder from each was distributed with a thoroughly flame-sterilized spoon into three tubes, each containing a different kind of culture medium. The tubes (twelve in all) were then incubated aerobically for four weeks and anaerobically for eight weeks. To provide for checking the results, three control plates were exposed by passing them through the atmosphere of the inoculating chamber several times.

In the foregoing experiments bacterial growth appeared in a total of three of the twelve tubes of media inoculated with meteorite powder. The systematic position of the organisms (a rod and a coccus) isolated from these growths was then determined by observing their morphology, as well as their cultural, staining and fermentation reactions. These tests established the rod to be *Bacillus subtilis*, and the coccus, *Staphylococcus albus*.

Of the three control plates exposed in the inoculating chamber, two developed two distinct types of colonies. The organisms from these colonies were subjected to an appropriate series of tests and were found to be also *Bacillus subtilis* and *Staphylococcus albus*.

The logical conclusion, therefore, is that the growth found in the three tubes inoculated with meteorite powder was the result of contamination with *Bacillus subtilis* and *Staphylococcus albus*, and not of meteoritic bacteria.

It would seem to this writer that Lipman could hardly have chosen a more unlikely substance, namely, meteorite, as the basis of his investigations. The composition and structure of meteorites point directly to their igneous origin. Fires must have glowed in cosmic furnaces of some sort in order to impart to meteorites the structure which they present to us. Further, stony meteorites commonly exhibit signs of partial refusion of certain of their constituents—an appearance comparable with the metamorphism produced in terrestrial rocks by intense heat. Obviously then, meteorites, unlike sedimentary rocks, cannot harbor bacteria while they are being formed or being reconsolidated, for neither molten magma nor the heat of metamorphism is inviting to living bodies.

These arguments, together with the experimental results obtained by the writer, strongly indicate that the alleged living bacteria found in meteorites by Lipman were probably contaminants, and not of extra-terrestrial origin as he claimed.

ETHIOPIAN TYPES INCLUDED AMONG SCULPTURES OF RACES

Types of three of the races which compose the population of Ethiopia are exemplified by sculptures in the Races of Mankind series by Malvina Hoffman on exhibition in Chauncey Keep Memorial Hall (Hall 3). They are a Hamite man, an Abyssinian (or Ethiopian) girl, and a Somali man.

Photographs copyright Field Museum of Natural History.

Ethiopian Types Shown in Chauncey Keep Hall

Left to right: a Hamite, an Abyssinian girl, and a Somali. Three aculptures by Malvina Hoffman in the Races of Mankind series.

The physiognomy of the Hamite shows features far removed from those typical of the Negroes. Especially is this evident in the refinement of the nose and mouth. Further testimony to this man's Caucasian derivation is found in the hair which, while frizzly, is not woolly like that of Negroes.

A high type of African beauty is reflected in the carved portrait of an Abyssinian girl. Here again we find features which show the influence left on the racial strains of Ethiopia by the Hamitic invaders. An interesting mode in hairdressing may be observed here —one which obviously must require considerable time and skill for its preparation.

The Somalis, who inhabit parts of Ethiopia, as well as other regions of northeast Africa (British, Italian, French Somaliland, etc.) are of Hamitic extraction. Unlike true Negroes, the Somali are characterized by wavy hair and oval faces. Their facial features are a little more delicately formed; the brown color of their skin is lighter. They rank among the taller tribes.

The Hamitic invasion of northeastern Africa is believed to have occurred in migratory waves in a remote period long before the dawn of history. Intermixture with Negroes gradually produced many new racial divisions of varying degrees of difference from their ancestors on both sides. In general it may be said that the Hamites possess dark brown or black hair, curly or wavy in form; skin varying in color from reddish to dark brown; and average stature of about five and one-half feet, with slender build. The typical Hamite has a long head, oval elongated face without forward protrusion, thin lips, pointed chin, and a prominent well-shaped narrow nose.

The sculptures of the Somali and Hamite men are in bronze; that of the Abyssinian girl is in black Belgian marble. Original photographs, and photogravure post card views of these and most of the other Races of Mankind sculptures may be purchased at the Museum. Mail orders are given prompt attention. Reproductions in bronze may be purchased by special arrangement.

ETHIOPIAN PLANTS IN HERBARIUM

Field Museum possesses a collection of plants having special interest because of current world events. The collection was made in the mountains and plains of Ethiopia one hundred years ago by Wilhelm Schimper, an Alsatian botanist who spent several years there. He collected thousands of plant specimens, and was probably the first European to become acquainted with the rich Abyssinian (or Ethiopian) flora.

Schimper was the discoverer, so far as science is concerned, of many of the most curious East African plants. Among them may be mentioned especially the giant lobelias. In America the lobelias, one of which is the brilliant cardinal flower, are low herbs, but those of the African mountains attain the size of small trees, and are of striking and almost fantastic appearance.

—P. C. S.

MEASURING TIME

With the recent adoption of Eastern Standard in place of Central Standard time for Chicago by the city council after considerable discussion of the matter between advocates of the change and those of the status quo, some of the methods of time measuring in other lands and ages, as illustrated in the exhibits of the Department of Anthropology, are of special interest.

Regardless of the merits or demerits of "daylight saving" as against standard and sun time, we nevertheless are still basically guided by the sun—the same master clock that has been used ever since people first began to count time. Some of the oldest timepieces in existence have been found in Egypt. These are the tall stone obelisks or pillars, made originally not as time measuring instruments but as records of the triumphs and honors of the Pharaohs. Egyptian priests, while studying the heavenly bodies, noticed that shadows from the obelisks changed in length with the changes in the sun's position between rising and setting. By marking off the surface on which the shadows were cast, a very simple form of sun dial was obtained. The Roman emperor, Augustus, had an Egyptian obelisk brought to Rome for this purpose. Among the Egyptian collections at Field Museum (in Hall J) are a small bronze obelisk with a figure of the lion goddess at its front, and an obelisk with the falcon-headed Horus before it. The first of these is hollow, and is believed to have once contained a small mummified animal.

Even before the Egyptians began to measure time, wise men of the East, in Babylonia, Assyria, and Persia, were working out systems of measuring time by years, seasons, months and days. They, too, made use of shadows cast by the sun, and there is evidence for a theory that the sun dial was a Babylonian or Chaldaean invention. When the Babylonian priests made calendars they usually marked wedge-shaped letters with a bone pencil or stylus on slabs of wet clay. Some ancient clay tablets, used for records, were obtained by the Field Museum-Oxford University Joint Expedition to Mesopotamia.

The Greeks probably learned about the sun dial from the Egyptians in the sixth century B.C., when many Greeks studied in Egypt, and the Romans learned its use from the Greeks. The Greeks were not satisfied however, because the sun dial could be used only when the sun was shining, so a Greek inventor devised a water clock. Water clocks were first used in Athens and Rome to time speakers in law courts. Large jugs, called amphorae, were used to pour water into these clocks. Examples of these bronze and pottery amphorae are on exhibition in Edward E. and Emma B. Ayer Hall (Hall 2).

The water clock, or clepsydra, as the Greeks called it, has been used in China for many centuries. The Chinese tradition is that Hwangti, one of the first emperors, invented it. Part of an old Chinese clepsydra is to be seen in George T. and Frances Gaylord Smith Hall (Hall 24). It operated by the pouring of water from a vessel into a tube connected with a covered cup. Little holes in the bottom of the cup let water down through another tube into an open dish in which a float with a pointer was placed. As the pointer rose, it touched a scale on the side of the dish, thus measuring the passage of time in ratio to the flow of water.

Malays among the islands south and east of China may have copied the idea, for in their boats they often carry buckets of water in which float coconut shells. It takes an hour for the water, coming up through a small hole in the bottom of the shell, to fill and sink it. When it sinks a watchman calls the time, and sets the shell afloat to measure the next hour.

THE OKAPI

One of the rarest animals in the world is the okapi, of which a specimen is on exhibition in George M. Pullman Hall (Hall 13). The okapi is the only extant relative of the giraffe. It is said that hunters find it the most difficult of all African animals to obtain. The specimen in the Museum was speared by pygmy natives in the Ituri forest of the Belgian Congo, and was obtained from them by the Marshall Field African Expedition.

The okapi is a forest animal of shy, secretive and nocturnal habits and is found only in a limited area of the Congo, inhabited mainly by pygmy black men who are extremely hostile to white people. Members of the expedition had to spend several weeks building up good will on the part of these pygmies before they could be approached with a proposition to obtain their aid in getting an okapi specimen, and their assistance is almost indispensable in hunting this elusive creature.

Giraffe's Only Extant Relative

The okapi, one of the world's rarest and most peculiar animals. This specimen is on exhibition in George M. Pullman Hall.

The okapi is a striped animal, and its existence was not suspected until as recently as 1900, when some strips of its skin were obtained from natives by Sir Harry Johnston, a British colonial administrator. At first these were thought to be pieces of the skin of a new type of zebra, but subsequently an entire specimen (skin, skull and skeleton) was obtained, and the animal was then found to be kin to the giraffe. It resembles more closely certain prehistoric ancestors of the giraffe, with whose fossil skeletons it has been compared, than it does the modern giraffe. The okapi's neck and legs are much shorter than those of a giraffe, but its teeth and horns are very similar. So far as records show, only one or two white men have ever seen this mysterious animal alive in its native habitat.

DECEMBER GUIDE-LECTURE TOURS

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 3 P.M., except Saturdays, Sundays, and certain holidays. Following is the schedule of subjects and dates for December:

Week beginning December 2: Monday—Eskimo Life; Tuesday—Plants Native to America; Wednesday—Animal Habitat Groups; Thursday—General Tour; Friday—Melanesia.

Week beginning December 9: Monday—Prehistoric Exhibits; Tuesday—Makers of Totem Poles; Wednesday—Animals of the Chicago Region; Thursday—General Tour; Friday—The Gem Room.

Week beginning December 16: Monday—China and Tibet; Tuesday—Story of Coal; Wednesday—Valuable Fur Bearers; Thursday—General Tour; Friday—Economic Botany Exhibits.

Week beginning December 23: Monday—Ancient Burials; Tuesday—Indians of the Southwest; Wednesday—Christmas holiday, *Museum closed;* Thursday—General Tour; Friday—Man Through the Ages.

Monday, December 30—African Animals; Tuesday—Interesting Geology Exhibits.

Persons wishing to participate should apply at North Entrance. Tours are free and no gratuities are to be proffered. A new schedule will appear each month in FIELD MUSEUM NEWS. Guide-lecturers' services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

Gifts to the Museum

Following is a list of some of the principal gifts received during the last month:

From Miss Julia T. Martin—a small grass basket and a birch bark needle case, Alaska and Michigan; from Henry Field—6 basalt blocks with Safaitic inscriptions, Trans-Jordan; from Dr. E. W. K. Andrau—2 basalt blocks with Safaitic inscriptions, Trans-Jordan; from Dr. E. E. Burr—2 colored anatomical models of a human head dissected to show muscles and structures of bones; from School of Forestry, Yale University—94 herbarium specimens, Ecuador and Colombia; from Ralph Throp—sample of nuts of the peanut walnut, Indiana; from Dr. Bento Chermont—a herbarium specimen, Brazil; from R. M. Tryon, Jr.—41 specimens of ferns, Indiana; from Illinois State Geological Survey—samples of vitrain, clarain, and fusain, Illinois; from Robert R. Lipman—a crystal of pyrite, Colorado; from Norton Company—2 specimens of boron carbide and five of norbide, Niagara Falls, New York; from Dr. Alfred Emerson—17 bats, 8 frogs, 7 snakes, a lizard, and a caecilian—Panama; from Karl P. Schmidt—50 specimens of snakes, frogs, salamanders, and turtles—Indiana and Illinois; from Edgar G. Laybourne—4 bird skins, Colorado; from Leslie Wheeler—a golden eagle, Illinois; from Mrs. Barnett Harris—62 insects, Zululand; from Chicago Zoological Society—a kangaroo, 2 monkeys, and a lesser koodoo, New Guinea, Africa, South America, and captivity; from Stewart Springer—4 mole skins with 5 skulls, and a bat, Florida; from Miss Winifred Smeaton—206 negatives, portraits of natives of Iraq.

NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from October 16 to November 15:

Associate Members

Allen Grawoig, W. Homer Hartz, Mrs. Louis Tallmadge Jaques, Mrs. Morris S. Rosenfield.

Annual Members

Harry Anderson, Dr. Arthur C. Bachmeyer, S. Frank Beatty, Charles Evelyn Beresford, Mrs. Edward F. Carry, W. W. Chandler, Soly Cini, Dr. Charles C. Clement, Mrs. Arthur H. Compton, Mrs. William W. Darrow, Walter I. Deffenbaugh, Mrs. Wentworth G. Field, Miss Kathryne Frankhauser, Alexander Goodkin, Miss Bertha F. Gordon, William W. Haerther, Mrs. George F. Henneberry, Mrs. William Kirchheimer, Mrs. H. B. Kuhns, I. Archer Levin, Miss Lydia Lichtenstein, Mrs. James J. McCarthy, Miss Gladys Alizabeth McCreight, E. E. Moore, Merritt S. Moore, Moray Munroe, J. W. Newey, Miss Grace Georgette Noee, Mrs. James J. Nolan, Mrs. Abraham M. Oberman, I. Oesterblom, Mrs. Marie S. Orb. Mrs. L. B. Patterson, Mrs. Robert G. Peck, Mrs. O. M. Perrenot, Miss Louise M. Purrucker, Stephen F. Roche, William F. Slade, Mrs. Wilmer M. States, Miss Katharine M. Stevens, William E. Tewson, Mrs. C. P. VanSchaack, Mrs. Edward H. Warszewski.

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